

Mortality data of adult burns in single burn unit for the last 17 years

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Aim: The aim of study was to determine the basic epidemiological characteristics of adults mortality data in single burn Unit in years 2005–2022.

Methods: We collected and evaluated data such as age, sex, day and month of injury, manner of burning, burn etiology, the extent of burned area, length of hospitalization, cause of death and the presence of inhalation trauma.

Results: In the present data, there were 113 deaths due to burn injury. Of these, 68 were male and 45 were female with M:F ratio was 1.5:1. The average age was 67.5 years. Seasonal variations showed that burn deadly incidence occurred mostly in winter 28 % . With indoor outdoor ratio 4.9:1. The incidence was more frequent during weekdays (70.8%). The highest incidence for male was Saturday and female was on Thursdays. Accidental burning was observed in 92 % of patients. The most common causative agent was flame (72.6%). The average burn extent in all cases was 47 % TBSA. The average hospital stay was 9.8 days. Multiple-organ failure was leading cause of death 62 %, followed by burn shock 29 %. In 49 % of patients, the condition was complicated by inhalation injury.

Conclusion: We recorded a significant decrease in mortality, especially in the last 5 years, we recorded 24 deaths, which is 21 % of the total number of burn deaths in the last 17 years. These results point to the constantly improving quality of care in medical burn facilities and continuous improvement of their prevention.

Fibrin Spray Delivery of Mesenchymal Stem Cells: An In Vitro Study to Assess Feasibility in Burn wound Treatment

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Aim: Although limited data is available for the evaluation of clinical efficacy of various cellular therapies for burns, treatments using mesenchymal stem cells (MSCs) have shown promise for accelerating healing. The aim of this work was to investigate the in vitro feasibility of a fibrin spray as a vehicle for topical administration of MSCs burn wounds.

Methods: Human bone marrow-derived MSCs (hBMMSC) were expanded in vitro and used at passage 4. Tisseel (Baxter, IL, USA), a commercially available two-component fibrin glue was used, and diluted for easier administration with spray. Cells were added to the fibrinogen component, which was mixed with the thrombin component and then casted or sprayed into a non-adherent 60 ml petri-dish using the EasySpray pressure regulator device (Baxter). Spraying, using either 0.5 or 1 bar pressure, was done at a 5-10 cm distance from the well. Cell viability was evaluated using Live/Dead staining. The cell morphology was investigated with phalloidin staining. Cell proliferation for up to 7 days was monitored using the Presto-blue assay.

Results: Live/Dead staining demonstrated the survival of hBMMSC after casting or spraying, confirmed by good cell viability after application. For both casted and sprayed groups, cells were well-distributed and -spread within the fibrin vehicle. The applications did not affect cell proliferation. Increasing the pressure from 0.5 to 1 bar did not have a negative impact on the cells.

Conclusions: Cell spraying in fibrin vehicle maintains the viability of hBMMSC and represents a promising method for applying mesenchymal stem cells on burn wounds.

The use of Meek micrografting in closure of small area defects in burn victims: a case report

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Aim: For burn victims with high total body surface area (TBSA), skin expansion techniques are used to enlarge the grafts. Mostly used is the Mesh technique. However, when surgeons are confronted with extensive burns, the Meek micrografting method is preferred to ensure a more reliable, regular and higher expansion rate of the grafts. In smaller defects, the Mesh technique still remains the golden standard and it has been reported that the meek for smaller defects can result in improved scar quality compared to Mesh.

Methods: A 51 year old male was admitted to the burn center with a scald, 38% TBSA. Loose skin was debrided and the wound was treated with povidone iodine solution and dressed with an alginogel in combination with Paraffin gauzes. Laser Doppler Imaging on the 3rd day showed deep burns of the right lower leg. Meek was used. The patient received standard aftercare of and was frequently seen in the outpatient scar clinic.

Results: Surgical debridement was followed by allograft application. These were removed 10 days later and autografting using the Meek technique (1:4) was performed. The Meek gauzes were removed 9 days post-operative and complete graft take was achieved. At 1.5 years post-burn, a mature scar is seen with no signs of hypertrophy or contracture present. Additionally no functional limitations from the target area nor the donor site were observed.

Conclusions: The Meek micrograft technique is excellent option for the closure of relatively small defects resulting in good graft take optimal aesthetic and functional outcomes.

Biologically relevant support for primary human keratinocytes, melanocytes and fibroblasts, under xenofree- and chemically defined conditions

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Aim: Enable the next generation of safe- and efficient skin expansion in vitro by replacing the current, undefined, and often serum-based alternatives by using recombinantly produced laminins for the major skin cells: keratinocytes, melanocytes, and fibroblasts.

Methods: We use recombinantly produced laminins, Biolaminins, as cell culture substrates. They can provide a biologically relevant support to the major cell types of the skin also from adult donors.

Results: We demonstrate that the effect is laminin isoform dependent and provides superior support to the proliferative cells within the skin, also from aged donors, compared to current methods. For example, the use of Biolaminin-521 in expanding adult primary keratinocytes resulted in 14 cumulative doublings compared to 8 with standard conditions after 30 days in cultures. Furthermore, the use of Biolaminins provides a better support for survival- and growth of freshly isolated skin cells resulting in a 4 times higher cellular yield.

Conclusion: In conclusion, this allows for a new generation of safe- and efficient in vitro expansion of human keratinocytes, melanocytes, and fibroblasts, under completely xenofree and chemically defined. We believe that this method of expanding adult human skin cells can be applicable to cell-based wound care, potentially also expanding the clinical use.

P005

Seasonal trends in burn injuries requiring admission to a regional burn center in Barcelona over a 5-year period.

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Aim: To examine the relationship between seasons and burn injuries requiring admission to a regional burn center in Spain in the last 5 years.

Methods: We will carry out a retrospective review of all patients admitted from March 2018 to February 2023 to our institution (Hospital Vall d'Hebron, Barcelona, Spain). Patients will be grouped into seasonal cohorts based on admission date. Using data from medical records, we will evaluate changes in patient demographics, mechanism of injury, total body surface area (TBSA), and mortality. Afterwards, a statistical analysis will be performed.

Results: Results will be presented by season and by year for each variable at study.

Conclusions: What we will learn from this review could be used to better assess the seasonal demands in ours and other burn centers in the southern European region.

Mortality rate and related factors among inpatients with burns in the university hospital in Bangkok, Thailand.

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Aim: We aimed to determine the trend in age-and sex-adjusted death among inpatients with burns in the university hospital in Bangkok, Thailand, between 2017-2022. In addition, we also explored the in-hospital mortality rate and associated factors among inpatients with burns.

Methods: A hospital-based retrospective cohort study was conducted in a trauma burn unit at a university hospital in Bangkok, Thailand. We included inpatients with burns admitted between January 2017 to December 2022. We calculated the mortality rate and 95% confidence interval (CI). A generalized linear model was used to calculate a p-value for the trend. Furthermore, multivariable analysis using the Cox regression model was employed to determine the associated factors of in-hospital mortality. A p-value less than 0.05 was considered statistically significant.

Results: A total of 240 inpatients with burn was included in the present study over six years. Age- and sex-adjusted death was 6.9%, 11.5%, 2.6%, 6.0%, 3.4%, and 8.0% in 2017, 2018, 2019, 2020, 2021, and 2022, respectively (p for trend = 0.672). A median time follow-up was 26.5 days; the in-hospital mortality rate was 1.97 (95% CI 1.13-3.21) per 1000 person-days. The adjusted hazard ratio (AHR) of in-hospital mortality among patients with burns who have higher age was 1.05 (95% CI 1.01-1.10). Patients with an increase in one percentage point of total body surface area (TBSA) of burn have 7% higher mortality. In addition, the AHR of in-hospital mortality among patients with fourth-degree burns was 9.00 (95% CI 2.22-36.57) times that of patients with less than fourth-degree burns.

Exploring the role of Computer-Assisted Decision-Support Tools in burn management: A rapid review

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Background: The biopsychosocial impact and need for intricate care, make burn management and recovery complex, while also being a global public health issue (particularly in low-middle-income countries). Computer-assisted decision-making tools (CADTs) are used in different clinical scenarios, yet its role in burn management seems limited. The multidimensional impact on quality of life of patients and those important to them, warrants palliative and end-of-life care in burn management.

Aim: This review outlines current uses of CADTs in burn management.

Methods: The review followed the PRISMA flow-diagram. Studies were extracted from PubMed using the following keywords:

(Decision Making, Computer-Assisted) AND ((Burn Units) OR (ICU) OR (Intensive Care Unit) OR (dermatology) OR (emergency medicine)) AND (Burns)

Retrieved records were screened based on titles, abstracts, full text access before analysis. The Hawker Critical Appraisal tool was used for quality assessment.

Results: 13 papers were included in this review. The majority (54%) discussed new software, showcasing the field's novelty. However, most studies gave fewer specifics regarding average participant age, burn severity, gender, and ethnicity. Using the Hawker Critical Appraisal Tool, the range of scores in the review varied from 21 to 36, with the average being 30/36, suggesting scope for future research improvement.

Conclusion Burns are a public health issue and would benefit from palliative care interventions, given the biopsychosocial impact it has on patients and those important to them. Further investigation of this impact on diverse populations (e.g., different age groups, burn severity, and ethnicity) is critical in translating CADTs into clinical practice.

Identification of blood-based signatures for inhalation injury prognosis in burns patients

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Aim: The study aimed to validate the relationship between inhalation injury and mortality and to analyse differentially expressed miRNAs as inhalation injury prognostic markers.

Methods: Blood samples (n=59) were collected from burns patients shortly after admission to the Western Cape Provincial Adult Tertiary Burns Centre, Tygerberg Hospital, Cape Town, South Africa for an 18-month period between 23 April 2016 and 15 August 2017. Spearman Rank coefficient (ρ) determined correlation size and direction between varying degrees of inhalation injury and mortality risk. Total RNA extraction, quantitation and quality analysis was performed on the blood sample. MiRNA expression profiles of 30 exemplar samples (mild and severe inhalation injury cases) were assessed using high throughput sequencing (Illumina NextSeq 550). Differential abundance analysis was determined using the DESeq2 and EdgeR statistical packages. Fold-changes were reported and $P < 0.05$ indicated significantly differentially expressed miRNA.

Results: A strong, positive correlation ($\rho = 0.441$, $P < 0.000$) was observed between inhalation injury and mortality: 10 differentially expressed miRNAs in mild and 23 in severe inhalation injury groups.

Conclusions: Inhalation injury was a potential co-factor of mortality in burns patients, supporting previous findings. The differentially expressed miRNAs are potential biomarkers for prognosis of mortality risk. Prognostic ability should be validated using pathway analysis to determine links between the differentially expressed miRNAs and the sequelae of potential events associated with inhalation injury in burns patients.

Covalently immobilized selenomethionine in Gelatin methacryloyl hydrogel promotes wound healing in aged skin by attenuating ferroptosis via arachidonic acid- GPX4 axis

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Aim: Explore the mechanism of epidermal stem cells (EpiSCs) aging to elucidate targets for better wound healing.

Methods: Transcriptome sequencing and untargeted metabolomics were performed, analyzed and verified on epidermis from young and aged mice. GPX4 and arachidonic acid (ARA) were screened out and interfered to reveal their effect in aged epidermis. AC-PEG tethers were used to covalently immobilize Selenomethionine (Se-Met) within GelMA hydrogels. A full-thickness skin defect model was established in aged mice to explore the effect of GelMA-Se-Met on wound healing and epidermal ferroptosis.

Results: Transcriptome data revealed metabolic adaptation in aged epidermis related to ARA, Cytochrome P450, Glutathione, Retinol, and Sphingolipid, etc. GSEA analysis showed increased ARA monooxygenase and metabolism. Untargeted metabolomics revealed unsaturated lipids upsurge, particularly ARA family. KEGG revealed an enrichment in the biosynthesis of unsaturated lipids and ferroptosis. Both mouse and human exhibit enhanced ferroptosis in aged epidermis, with decreased GPX4. ARA could induce ferroptosis in EpiSCs lacking GPX4. Additional ARA feeding could induce ferroptosis in EpiSCs of middle-aged mice compared to young mice. Se-Met showed protective effect against ARA-induced ferroptosis. AC-PEG-functionalized Se-Met retained the native bioactivity of Se-Met and was stably retained within GelMA for over 7 days. 10% GelMA-Se-Met hydrogel promoted wound healing in aged mice, with improved wound healing, increased GPX4, decreased lipid peroxidation, and ARA levels.

Conclusion: Enhanced ferroptosis in aged epidermis may be due to decreased GPX4 and increased ARA, which may lead to delayed wound healing. GelMA-Se-Met hydrogel promoted wound healing by supplementing GPX4 expression and inhibiting ferroptosis.

Use of meshed autografts with cryopreserved allografts from in vitro cultured human epidermis for treatment of full-thickness burns. Case report

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Aim: Demonstrate that in vitro cultured human epidermis allografts promote faster epithelialization of burns.

Methods: In the Burn Unit of the Traumatology Hospital “Dr. Victorio de la Fuente Narvárez” of the IMSS, allografts of cultured human epidermis have been used successfully in therapy of the burned patient.

This case report describes the treatment of a feminine patient of seventy years old with full-thickness burns using autografts of skin expanded three to six times their original size, covered with allografts of cultured epidermis.

Results: In the previously mentioned case, this strategy was used since in a single surgical session it was not possible to cover all the lesions. However, therapy with meshed autografts and cultured epidermal allografts allowed all these lesions to be covered in a single surgical session, with complete re-epithelialization in only 12 days.

Conclusions: It is important to emphasize that the recovery of a burned patient depends on a rapid epithelialization of the affected areas. With our case presented, the usefulness of the cryopreserved allografts of human epidermis cultured in vitro, in the early epithelialization of the donor areas and the meshing of the autografts, reducing the epithelialization time of the affected areas and the hospital stay.

The Aftermath of Covid-19 Pandemic on Burn Referral Service

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Aim: Rising to the challenges and burden of Covid-19 crisis, healthcare settings has been reshaped and adjusted to ensure safe and adequate patient care. This is shown in our experience examining the clinical and epidemiological profile of acute burn patients before, during and after Covid-19 pandemic.

Methods: This is a retrospective observational study, comparing acute burn patients presented in winter months (December, January, and February) of 2018/19, 2019/20 and 2022/23. These three time periods were selected to represent pre-Covid, during Covid and current trend respectively. Comparisons were performed using either Pearson's χ^2 for categorical variables or one-way ANOVA for continuous variables.

Results: 62 patients (Female=34; Male=28), 64 patients (Female=29; Male=35), and 80 patients (Female=42; Male=38), were referred in 2018/19, 2020/21 and 2022/23 respectively. We observed an overall upward trend of burn referrals after the pandemic, especially for patients under 16. There was similar pattern in the mean percentage of total body surface area with 1.1% in 18/19, 1.4% in 20/21 and 1.4% in 22/23. The mechanism of burn has changed with majority in 18/19 and 22/23 being scald burn (64.5% vs 62.5%), but the percentage of contact (40.6%) and scald (43.8%) burns were similarly high ($p=0.02$) during 2020/21 period.

Conclusions: This study gives a brief overview of burn patient profile pre, during and post Covid-19 lockdown. The surge in 22/23 provides evidence of potential increased burn service demand associated with influence of Covid-19. Change in lifestyle such as working from home may have led to changes observed in burn mechanisms.

Systemically increased neutrophil activity and altered coagulatory phenotype after burn injury

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Aim: This study aimed to investigate the systemic neutrophil response and procoagulatory effects in time after burn injury.

Methods: Plasma was obtained from burn patients (n=7; mean total body surface area of 35% burned) at different time points post-burn (1-15 days) and healthy controls. Herein, the levels of neutrophil activation marker (HNE-a1ATC), DNA cleaving protein (DNase1), nucleosome complex for extracellular DNA and MPO bound to extracellular DNA for neutrophil extracellular traps (NETs), as well as the coagulatory markers prothrombin factor 1.2 (PTF1.2), thrombin anti-thrombin complex, tissue plasminogen activator (tPA), and plasminogen activator inhibitor 1 (PAI-1) were determined by ELISA. Additionally, correlation analyses between these plasma levels were performed.

Results: Increased plasma levels of HNE-a1ATC, DNase1, nucleosome complex NETs, tPA, and PAI-1 were found in burn patients compared to healthy controls. HNE-a1ATC, NETs, and PTF1.2 were significantly correlated to timing after burn injury. Levels of nucleosomes and PTF12 significantly correlated with burn wound size. Burn wound size and depth, plasma nucleosome and PAI-1 levels significantly correlated to plasma C-reactive protein levels.

Conclusion: Our study shows a systemic increase in neutrophil activity, NET formation and coagulatory markers after burn injury with no clear effect over time, that may be caused by observed local intravascular coagulation post-burn.

Epidemiology of the critically ill burn patient in the reference Trauma Center of Catalonia

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Aim: To know the real incidence of critical burn patients admitted to a reference Trauma Center

Methods: We evaluated patients admitted to the Burn Unit of the Vall d'Hebron University Hospital from 2012 to 2022. Consecutive cohort of burned patients who required invasive mechanical ventilation (IMV) or amines given their severity on admission is studied. A total of 443 patients were reviewed and classified as critical burn patients. We collected demographic data, presence of inhalation injury (IH), percentage of Total Body Surface Area (%TBSA), burn injury mechanism and mortality.

Results: With a reference population of 8.6 million inhabitants, we have observed 4.68 admissions for burn injuries per 100,000 inhabitants. Of these, 0.88 per 100,000 will meet the criteria for a severe burn patient and only 0.49 per 100,000 will be considered critically burned with our criteria. Of the total of 443 patients, 70.42% are men (312), the mean age is 48.96 years with a SD of 18.41. The percentage of %TBSA is 29.24% with a SD of 21.07. A total of 159 patients (35.9%) concomitantly had smoke inhalation syndrome. The most frequent injury mechanism was flame (53.72%) followed by deflagration/explosion, (31.15%) scald (6.99%), electrical injury (6.1%), chemical injury (1.58%) and finally freezing and dermabrasion (0.23%). Overall mortality was 19.6%, a total of 87 patients.

Conclusions: Knowing the incidence of critically ill burn patients in our area leads to better care management and outcome in our reference units

Evaluation of the efficacy of Nexobrid in the treatment of critically ill burned patient: an analysis of trends in use and safety

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Aim: To evaluate the use of Nexobrid and its safety in critically ill burn patients.

Methods: We evaluated patients admitted to the Burn Unit of the Vall d'Hebron University Hospital from 2012 to 2022. Consecutive cohort of burned patients who required invasive mechanical ventilation (IMV) or amines given their severity on admission is studied. A total of 444 patients were reviewed and classified as critical burn patients. We collected demographic data, presence of inhalation injury (IH), percentage of Total Body Surface Area (%TBSA), mortality and use of enzymatic debridement.

Results: Of the total of 444 patients, 111 were treated with Nexobrid to debride a burned area. Nexobrid was used to debride 7 critical burn patients in 2015, 16 in 2016, 13 in 2017, 11 in 2018, 19 in 2020, 11 in 2021 and 16 in 2022. Respectively 14.28% of the Critical patients received some debridement with Nexobrid in 2015, 34.04% in 2016, 27.08% in 2017, 32.35% in 2018, 51.42% in 2019, 63.33% in 2020, 55% in 2021 and 72.72% in 2022. The % of mean TBSA debrided with Nexobrid from 2015 to 2022 is: 16.42%, 17.12%, 7.84%, 11.91%, 13.55%, 12.84%, 20.45% and 19.93% respectively. In the logistic regression model, we observed that the use of nexobrid at the same %TBSA, age and inhalation does not increase mortality

Conclusions: The use and percentage of debrided area with Nexobrid has progressively increased. The use of Nexobrid in the critical burn patient is safe.

Mortality predictor scores in the critically burned patient. ABSI, modified ABSI and revised Baux score nomogram. Which one is closer to the real mortality?

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Aim: To evaluate which of the predictive mortality scores is closest to the real mortality of our burn unit

Methods: Critical burn patients admitted to the Burn Unit of the Vall d'Hebron University Hospital from 2018 to 2022 was evaluated. A consecutive cohort of burn patients who required invasive mechanical ventilation (IMV) or vasopressors is studied given their severity on admission (129 patients). Demographic data, mortality, full thickness burn, inhalation injury and predictor scores of mortality: ABSI, modified ABSI (mABSI), revised nomogram Baux and APACHE II were collected. We assessed the predictive accuracy of the different scores of mortality using logistic regression. We used the measure of the area under the ROC curve to assess the predictive accuracy of the model.

Results: The results of area under the curve (AUC) for predicting death in ABSI, mABSI, revised nomogram Baux and APACHE II are respectively: 0.7912, 0.7634, 0.8009 and 0.6639.

Conclusions: APACHE II is a poor predictor of mortality in critically ill burn patients.

The results make us consider that ABSI, mABSI and revised nomogram Baux score are good tests to predict death in our burn patients.

Logistic regression analysis seems to suggest that full thickness, inhalation injury and sex parameters, thanks to modern resuscitation techniques, are less relevant than previously thought of.

Baux score seems to be the more accurate model for our data

Failed endotracheal intubation in a severely burned patient with uncomplicated airway management in previous surgeries - a case report

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Aim: To report a case of failed endotracheal intubation in a patient with major burns who had early developed subglottic tracheal stenosis.

Methods: A 51-year-old male (50% TBSA, IIb- and III-degree burns of head, neck, and back) was scheduled for the 5th necrectomy and autotransplantation of the skin. He had mild dyspnea due to inhalation injury and pneumonia. After induction with sufentanil, propofol, and rocuronium there were no complications with mask ventilation. Direct laryngoscopy was performed and the patient appeared to be Cormack-Lehane grade I but the 7.5 mm and 7.0 mm internal diameter endotracheal tubes failed to pass the vocal cords. Flexible fiberoptic bronchoscopy revealed granulations that narrowed subglottic space to approximately 3 mm. After reversing the neuromuscular blockade with sugammadex, the patient was awakened. After the neck CT scan and consultation with an ENT surgeon, the patient was scheduled for a tracheotomy.

Results: Neck CT scan showed significant narrowing of the trachea to a diameter of 6 mm in a length of 32mm. ENT surgeon performed tracheotomy under local anesthesia with sedation. After the burns treatment was completed, tracheal resection and reconstruction were performed and the patient was discharged home for further rehabilitation.

Conclusion: We find this case report valuable in increasing the awareness of the potential early granulation development causing tracheal stenosis in major burn patients undergoing multiple airway manipulations. Additionally, it is every physician's responsibility to perform tracheal intubation following preventive guidelines to minimize the risk of developing postintubation tracheal stenosis.

Evaluating the efficacy and safety of Landiolol Hydrochloride for management of arrhythmia in septic burn patients.

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Aim: To investigate whether landiolol, an ultra-short-acting cardio-selective beta blocker, can safely and effectively control heart rate in critically ill septic burn patients with supraventricular tachyarrhythmias.

Methods: Fourteen septic burn patients suffered from supraventricular tachyarrhythmias (heart rate ≥ 120 bpm for > 1 h) admitted to a burn ICU between November 2021 and January 2023 were included. Arterial pressure, heart rate, cardiac rhythm, and cardiac output were recorded at 1, 8 and 24 h after the initiation of tachyarrhythmias. The primary endpoint was heart rate response and the absence of increased vasopressor requirements during the first 24 h after initiating treatment.

Results: Mean age of patients was 45 ± 21 years, Total Body Surface Area Burned was $37 \pm 23\%$ and Sequential Organ Failure Assessment score was 8 ± 5 . Paroxysmal atrial fibrillation (5 patients), paroxysmal atrial tachycardia (2 patients), and paroxysmal supraventricular tachycardia (7 patients) were observed during septic episodes. The initial landiolol dose administered was 20 ± 11 mcg/kg/min. Rapid and substantial reduction of heart rate was observed in septic patients treated with landiolol without any deterioration of hemodynamics (cardiac output, arterial pressure). No increase in the requirements of norepinephrine was observed. Landiolol significantly reduced heart rate (from 125 ± 16 bpm to 85 ± 12 bpm). The conversion to sinus rhythm was observed in 3 patients with paroxysmal atrial fibrillation.

Conclusion: Landiolol safely reduced heart rate and, in part, converted to sinus rhythm in septic burn patients with supraventricular tachyarrhythmias.

Blood management in burn surgery: a retrospective analysis study SOC vs enzymatic debridement (ED)

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Objective: Patients with major burn injury frequently require multiple blood transfusions that increases with delay to primary burn excision. Patient Blood Management (PBM) represents an international initiative in best practice recommended by World Health Organization (WHO) EU commission. Our objective in this study was to assess blood loss eschar removal in 2 different group NXB vs SOC.

Methods: We conducted a retrospective study comparing consecutive adult burn patients admitted in Verona Burn Center treated before (n=22) and after (n=22) introducing rapid bromelain-based ED. The study sample consisted of 44 subjects, of whom 22 (50.0%) were treated with enzymatic debridement (ED) and 22 (50.0%) were treated surgically (SOC). Patient data were summarized using descriptive statistical methods.

Results: Mean age was 59 years, 54% male, mean TBSA was 23.5%. Two groups were comparable in terms of age, sex, and TBSA. Median of time to complete debridement was 7.8 days in SOC group; 1.2 days in ED group. Blood units required after debridement procedure was 1.3 ± 2.0 (0-8); 2.5 ± 2.3 (0-8) in the SOC group; 0.1 ± 0.5 (0-2) in the ED group, p-value <0.0001.

Conclusion Blood product transfusion has historically been utilized after major burn injury . Transfusion has been implicated in infection and immunosuppression in many disease states. Blood management improves patient outcomes and reduces costs. Enzymatic debridement should be take in account as tool in the blood management.

INITIAL FLUID RESUSCITATION IN BURN PATIENTS ADMITTED TO THE INTENSIVE CARE: RISK FACTOR FOR KIDNEY INJURY AND MORTALITY.

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Aim: To examine fluid resuscitation during first 72 hours and its effect on kidney injury and mortality.

Methods: We conducted a retrospective study in patients with total burn surface area (TBSA) $\geq 40\%$ admitted to a burn critical care unit between 2017 to 2022. We collected fluids administered during the first 72 hours. The first 24 hours Parkland formula was applied, afterwards patients were divided into groups according to the type and amount of fluids administered crystalloids groups ($< 5,000\text{ml}$ vs $\geq 5,000\text{ml}$); colloids (albumin 5%) groups ($< 2,500\text{ ml}$ vs $\geq 2,500\text{ ml}$) and total intravenous fluids groups ($< 10,000\text{ ml}$ vs $\geq 10,000\text{ ml}$). A chi-square test was performed to determine correlation between groups and renal failure and death.

Results: A total of 25 patients were included (20 men/5 women, average age of 44 years old). Of them, 8 patients (32%) developed acute kidney injury (AKI), requiring 3 patients (12%) renal replacement therapy. AKI showed more incidence in the groups of crystalloids $\geq 5,000\text{ ml}$ (20% vs 10%, $p 0.18$), colloids $> 2,500\text{ ml}$ (28% vs 4%, $p 0.2$) and total fluids $\geq 10,000\text{ ml}$ (25% vs 8%, $p 0.14$). Mortality was higher in patients with AKI (28% vs 12%).

Conclusions: AKI which is independently associated with high mortality in burned patients, is still highly prevalent (1). Current studies (2) promote reduced and target-guided fluid therapy, not just be guided by urine output, to prevent the appearance of AKI and reduce mortality.

PRONE POSITIONING IMPROVES OXIGENATION IN BURN PATIENTS WITH SEVERE ACUTE RESPIRATORY DISTRESS (ARDS): A SERIE OF THREE CASE REPORTS

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Aim: Although prone positioning (PP) has been proven to improve oxygenation in patients with acute respiratory distress syndrome (ARDS), it is challenging in burn patients due to the difficulty skin protection.

Methods: We collect 3 men of burn patients (TBSA 35%, 20% and 25%) who developed ARDS without response to lung protective ventilation, muscle relaxation and nitric oxide. The mechanism was deflagration, with inhalation syndrome in only one of them. As a personal history, they were smoker and 2 two of them obese.

Results: PP was established in 4 occasions in all of them. The oxygenation improvement was achieved 2 hours after adopting the position. Mean PaO₂/FiO₂ ratio increased from 75 (+/- 12) to 187 (+/- 86). Patients were volume control ventilated (6-8 ml/kg) with PEEP 10-14 cmH₂O. Days of mechanical ventilation were 32, 39, 38, respectively.

Two patients had chest burns, so it was important to protect these areas.

No patient died and they were discharged from the hospital without oxygen therapy or respiratory sequelae.

Conclusions: Prone positioning improves oxygenation in burn patients with ARDS, and may reduce the high mortality described in this scenario. How to protect the skin in PP is yet controversial. However, a more comprehensive study with larger sample size is required to make a valid conclusion.

BLOOD TRANSFUSION IN SEVERE BURN PATIENTS: A RETROSPECTIVE REVIEW IN BURN CRITICAL CARE FROM 2017 TO 2022

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Aim: To determine factors associated with transfusion requirement and mortality.

Methods: We perform a retrospective study of patients with $\geq 40\%$ total burn surface area (TBSA) admitted from January 2017 to December 2022. Demographic information, and blood transfusion details during the first month were analyzed. Patients were divided into two groups according to red blood cell (RBCs) units transfused (< 10 vs ≥ 10 units). A chi-square test was performed to determine correlation between transfusion, TBSA% and death.

Results: We include 25 patients, of which 20 patients who survived more than 24 hours were studied (10 patients transfused < 10 units; 10 patients transfused ≥ 10 units). In both groups transfusions were performed from the 6th- 7th day, probably in connection with debridement surgeries.

Administration of tranexamic acid was performed during surgeries.

We observed that only 25% patients with TBSA 40-60% required > 10 Units vs the 40% of patients with TBSA $> 60\%$ (p 0.1)

Mortality was 10% in patients transfused < 10 units vs 20% in patients transfused ≥ 10 units (p 0.25)

Statistical analysis didn't find significant differences.

Conclusions: Severe burn patients show high transfusion demand. In our study, as in the literature, it increased TBSA is associated with increased transfusion and mortality. More data are needed to establish the risk factors.

The sofa score as a predictor of in-hospital mortality in critically ill burn patients

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Aim: To assess the role of the Sequential Organ Failure Assessment (SOFA) score between Day 1 to Day 4 as a predictor of in-hospital mortality in critically ill burn patients.

Methods: This is a retrospective cohort study of adult victims of thermal burns who met the criteria for intensive care burn unit (ICBU) admission and who survived more than 3 days in hospital, during the period 2019-2021. Demographic data along with SOFA scores were measured for the admission day and subsequent 3 days (SOFA 1, SOFA 2, SOFA 3, SOFA 4). Multivariate logistic regression analyses, including other variables associated with mortality, were performed to calculate adjusted odds ratios (ORs). Additionally, area under the receiver operating characteristics curve (AUROC) were calculated for mortality, comparing day 1 to day 4 SOFA scores.

Results: A total of 136 patients were included, with a mortality of 16.9%. After adjusting for age, TBSA% and inhalation injury, Day 1 and Day 2 SOFA scores demonstrated superiority in predicting in-hospital mortality. SOFA1 OR 1.73 (95% CI 1.18-2.54) p-value 0.005 and SOFA2 OR 1.50 (95% CI 1.08-2.06) p-value 0.015. AUROC for the prediction of mortality by SOFA1 was 0.82 (95% CI 0.696-0.955) and SOFA2 0.871 (95% CI 0.776-0.966).

Conclusion: In critically ill adult burn patients, early SOFA scores (SOFA 1 and 2) were independently associated with mortality, demonstrating superiority to late changes in SOFA scores (SOFA 3 and 4). This allows for their potential use as an adjunct to the commonly utilised validated prognostic scores to predict mortality.

Extensive burns in elderly patients and their adjuvant treatment with human keratinocyte allografts.

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Burns in older adults pose a significant public health problem due to their susceptibility to complications, concomitant diseases, malnutrition, and neglect by family members. A burn is severe if it affects 10% or more of the body surface area and involves second-degree or deeper burns or special areas. The Burn Unit at the Traumatology Hospital VFN in Mexico City has implemented an early medical and surgical management protocol and the use of cultured human keratinocyte allografts to treat these patients comprehensively. Allografts were used in areas affected by superficial second-degree burns, mixed areas, and donor areas of partial-thickness grafts. The protocol included early fluid resuscitation, antibiotic therapy, adequate nutrition, surgical cleaning, and live cultured keratinocyte allografts. The use of allografts significantly improved the clinical evolution and prevention of complications in severely burned older adult patients. This therapy is considered an important adjuvant therapeutic armamentarium for improving both patient survival and their definitive prognosis.

Northeast of Scotland Sealed Silver dressing practice in Paediatric burn injured patients

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Aim: Infection prevention is essential in burns management. Burns may require dressing changes, antibiotics and reconstruction. Regular dressing changes allows for close monitoring. Liberal antibiotic use leads to resistance. We have assessed our use of sealed silver dressings in paediatric patients over a 3-year period. The purpose is to review practice using this technique and to assess its outcomes, focusing on infection rates.

Methods: E-notes were used to collate data retrospectively, this is routinely submitted to Care of Burns in Scotland database. Data was collected for all patients referred to our Paediatric department with injuries between November 2019 and December 2022.

Results: We have treated 187 patients with the Acticoat™ protocol. Application of our silver dressing occurs in theatre under general anaesthetic, and lasts for 7 days before requiring a change; patients return to theatre every 7 days if further debridement or Acticoat™ dressings are anticipated. This reduces PTSD, pain, dressing changes, overall burden to the service and the patient. Prophylactic antibiotics are not routinely prescribed. Furthermore, these patients can usually be managed as outpatients with planned day-case unit admissions, this reduces duration of inpatient stay. Of our 187 patients; 20 were prescribed antibiotics, 5 suffered infected burns, 1 with an infected donor site and 2 were treated as TSS. Patients treated for TSS had delayed presentations and were not managed as per our usual local protocol.

Conclusion: We concluded that our protocol achieves low rates of infection without routine use of prophylactic antibiotics and minimizes burden on the service.

introduction of a bacterial binding dressing in a uk burns centre

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Aim: introduction and evaluation of a bacterial binding dressing within a uk burns centre to explore its use in reduction of wound colonisation, reduced use of topical antimicrobials with view of reducing endotoxin release at the wound bed from dead cells to see if this will lead to improved wound healing.

Methods: introduction of Sorbact dressing as a primary layer to wounds that fit inclusion criteria

Wound Images recorded in patients notes pre, during and post application. Staff and patient feedback collected as part of the trial with use of feedback form.

Results: Clear visual reduction of wound discoloured exudate, clear molculyte images with reduction of visual coloured infection to show reduction of areas of colonisation, over its use for 6 days with 1 reapplication of product during this time. Sorbact was compared to comparable wound on same patients with multiple microbiology using standard dressing practice ie acetic acid or silver showing improved wound bed preparation for further grafting in deeper colonised burns wounds leading to earlier application of skin graft.

Staff found product easy to use but felt the sizes of dressings needed to be bigger. Patients feedback was no concerns.

Conclusion: Within cohort of patients tried with Sorbact dressing data shows it is effective burn wound decolonising dressing that is easy to use and Cost saving overall. Further studies with bigger numbers of patient required to validate data and bigger dressing sizes need to be produced.

Cutaneous manifestations of candida parapsilosis in burns patients: A novel pathognomonic clinical sign for the burn surgeon to look out for

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Aim: To present two patients, one with 85% TBSA and the other with 65% TBSA burns, who both developed superimposed Candida Parapsilosis infection within their burn wounds.

Methods: A 16 year old patient with 85% TBSA burns and a 33 year old patient who had 65% TBSA burns, who both had prolonged stays on the Intensive Care Unit, and multiple burn operations, who subsequently developed Candida Parapsilosis infection.

Both patients grew multi-drug resistant pseudomonas that required the removal of Biodegradable Temporising Matrix (BTM), use of multiple antibiotics, topical acetic acid and Sodium Hypochlorite. Clearly demarcated cutaneous lesions were identified over the torso and lower limbs and histopathological analysis performed.

Both of these cases demonstrated clinical signs of Candida Parapsilosis infection and involved instigation of treatment in a timely manner whilst awaiting candida sensitivities and subsequent anti-fungal therapies.

Results: Discreet erythematous circular lesions with well-defined central ulceration with halo, over the torso and lower limbs of the burn-affected areas were demonstrated.

Histopathology of the cutaneous lesions identified Candida Parapsilosis.

Both patients were Beta-d-glucan positive, with one having a level of 253 pg/ml. (Normal: <83 pg/ml).

Conclusions: Candida species are becoming more common in patients with severe burns, with Candida Parapsilosis an increasing cause of morbidity and mortality over the past two decades. This case report highlights the subtle and novel clinical pathognomonic lesions that can be utilised to rapidly identify Candida Parapsilosis superimposed infection in delayed healing wounds.

A simple mnemonic, B.U.R.N.S., for burns first aid

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Introduction: Burn injuries remain common in the world. Singapore sees an average of 220 burns admissions annually. The authors identified that there is a need for more public awareness on first aid burn treatment. The authors devised a simple mnemonic that can be used in burns education for first aid treatment to be taught to trained first responders, who will have the first contact with these burn patients.

The aim was to assess the viability of implementing this mnemonic, B.U.R.N.S, to facilitate first aid education for burns.

Material and methods: In the pilot, we presented this mnemonic as a poster to 30 full-time burn care medical professionals. Feedback was then obtained from this group of medical professionals and used to revise the mnemonic. The mnemonic was then subsequently taught to 400 first responders . They are then asked to reiterate the mnemonic to test the ease of remembering the mnemonic. Objective feedback was obtained with a 5-point scoring system.

Results: The results indicated a significant improvement in burn first aid knowledge after the implementation of the mnemonic, from a score of 3.67–4.77, The content was deemed as appropriate and easy and participants were able to recall the content,

Conclusion: The study results suggest that this B.U.R.N.S. mnemonic and visual aid is simple and easy to apply, especially for uniformed personnel, Overall, burns first aid awareness and education can be improved with the implementation of this mnemonic and poster.

Open-cohort observational study of the efficacy and cost-effectiveness of integrated aftercare models for burn-patients: A study protocol

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Aim: To develop a study-protocol to investigate whether different aftercare-models generate sufficient effectiveness to improve the burn patient's quality of life (QoL), more specifically an increase in Quality-Adjusted-Life-Years (QALY) one year after discharge from the hospital.

Method: The study is divided in two parts. Study-Part A is an open-cohort prospective observational study of different aftercare-models in terms of QoL of burn-patients. These aftercare-models consist of scenarios of multidisciplinary care pathways which are part of the patients' usual care. Study-Part B is a quantitative comparative health-economics study.

The population consists of burn-patients ≥ 8 years that meet the national legal criteria for referral to a burn-center and are at least eight years old.

The outcome measures for the prospective observational study are the QoL-questionnaires EQ-5D-5L and SF-36 which form the basis for the health-economic analyses. Burn-specific QoL is measured with BSHS-B and scar-quality is assessed with POSAS. The patient is expected to keep a diary where all visits to caregivers and all costs made out-of-pocket are registered. Semi-structured interviews with patients and caregivers will identify the facilitators and barriers in the implementation of care. Finally focus-groups will formulate recommendations to optimize the organization of the aftercare of burn-patients.

Results: The study was found ethically acceptable by IRB ZNA-Antwerp, Belgium EC 5780 – 009OG031.

Conclusion: Evaluating the efficacy and cost-effectiveness of different models of burns aftercare is essential in striving towards a full life beyond mere survival for burn-patients. This study-protocol could serve as a template for comparative burns aftercare research.

Using AnaConDa to treat opioid tolerance in a severe burn patient

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Aim: To share our experience using AnaConDa to treat opioid tolerance attempting to improve pain management to a complex burn patient suffering 85% TBSA.

Methods: Information and data were extracted from the patient's medical journal, nurses- and doctors reports. We compiled and gathered experiences through oral discussions and dialogue with doctors and nurses that treated the patient.

Results: After long term treatment with high doses of opioids the patient's experience of pain became difficult to treat. Critical treatments such as mobilization and daily procedures appeared unmanageable. Opioid rotations, different medical combinations and other interventions became insufficient over time. For the first time in our burn unit we decided to use Isoflurane through the anesthetic conserving device "Anaconda", to resensitize the patient to opioids. The treatment lasted for 7 days. After waking up the patient suffered from delirium for 7 days, the normal routines were disrupted and the amount of opioids given escalated due to sustained pain complexity. 15 days post-treatment the opioid levels were almost back to initial levels.

Conclusion: We found both beneficial and non-beneficial effects from the treatment. The resensitization was effectfull but temporary. The following delirium made general treatment difficult and caused psychological downsides for the patient. The AnaConda treatment did not solve the tolerance permanently, but might have served as a reset and thereby enabled new strategies regarding pain management.

Eye-tracked computer games as a method for pain perception alleviation in chronic wound management

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Aim: Chronic pain frequently accompanies the daily lives of many chronic wound patients. The degree of pain experienced significantly increases when performing medical procedures related to wound management. The use of eyetracked games in order to distract the patient from the painful activities performed can be an effective procedure.

Methods: 40 patients suffering from chronic wounds were qualified for the study. Patients performed eyetracking games during dressing changes and wound cleaning. Pain sensations were surveyed. The survey concerned the pain experienced on a daily basis, when changing the dressing without use and with the use of eyetrackers.

Results: On the basis of the obtained results, it was found that eyetrackers significantly reduced the pain experienced during dressing changes compared to the pain caused by these procedures, but without the use of eyetrackers.

Conclusions: On the basis of the obtained results, it was proposed to introduce eyetrackers into routine clinical practice during chronic wound management.

Improving the pain management of burns patients

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Aim: Examine whether patients received analgesia in line with existing London and Southeast-Burn-Network guidelines and determine if specific demographic factors influence pain.

Methods: We examined the records of patients admitted to Chelsea and Westminster Burns Unit between November 2021 and June 2022, recording patient demographics, pain scores (0-10) before and during dressing change on admission and first change of dressing (COD), and analgesia given.

Results: Data was collected for 246 patients (167 adult [mean age 52.7; 89 male, 78 female] and 79 paediatric [mean age 4.5]). 426 dressing changes were further analysed (492 total, 66 excluded). Analgesia requirements were managed appropriately on 157 occasions (52%) in adult patients and on 53 occasions (43%) in paediatric patients. Overall, pain scores were higher in female patients (mean 1.27 prior, 4.67 during COD) than male patients (mean 1 prior, 4.17 during COD). Patients aged ≥ 70 had the lowest mean pain scores (0.99 prior, 3.9 during COD), and patients aged ≤ 50 years had the highest pain scores (mean 1.27 prior, 4.75 during COD). Black patients had higher pain scores (1.22; 4.59) than Asian (1; 4.46) or white (0.9; 4.06) patients.

Conclusion: Less than 50% of patients in our study received appropriate analgesia. Staff education on appropriate pain management and a particular emphasis on the variable experiences to pain noted in different patient demographics is needed. We recommend further research into factors influencing pain thresholds to help guide appropriate analgesia management and recommend consideration of ancillary techniques such as virtual reality to improve patient experience.

Outpatient treatment in pediatric patients with second-degree burns with cryopreserved cultured cutaneous allograft, epifast® in emergency service

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Aim: Ascertain the morbidity reduction and high efficacy of the second-degree burns treatment with Cryopreserved Cultured Cutaneous Allograft (CCCA), epifast® in pediatric patients with outpatient management, in emergency service.

Methods: A retrospective and observational study was performance in under 17 years patients with second-degree burns treated with CCCA, in the emergency service of traumatology Hospital "Dr. Victorio de la Fuente Narváez" IMSS in México City. We reviewed a total of 34 pediatric patients files since January 1st 2021 to December 31st, 2022.

Results: Of the 34 pediatric patients files reviewed, 2 of them were discarded due to lack of follow-up. A total 32 pediatric patients with files follow-up treatment were analyzed. The follow-up treatment days mean was 20.7 days (5 to 120 d), the age mean was 5.4 years (8m to 17y). The burns causes were mainly hot liquid scald, 78.12% (n=25), hot liquid immersion, 9.3% (n=3), fire, 6.2% (n=2), solar radiation and direct fire, 3.1% each (n=1). The surface burns percentage mean was 4.8% (1 to 10%); 29 patients had a correct evolution, at 10 days of follow-up, 27 had a total epithelization, 5 had a partial epithelization and only 3 patients of them required skin grafts application; nonpatient present morbidity.

Conclusion: The treatment of second-degree burns with Cryopreserved Cultured Cutaneous Allograft, epifast® is highly effective due speed-up the epithelization time, avoid morbidity and reduce the need of skin graft.

Successful treatment of full body epidermal detachment in toxic epidermic necrolysis in a child using Suprathel®

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Aim: Toxic epidermal necrolysis (TEN) is a life-threatening disease characterized by the detachment of the epidermis and mucous membranes. Herein we describe the management of a TEN with a detachment of >90% of total body surface area (TBSA).

Methods: This is a case of an 11-year-old girl with a history of Crohn's disease and Autoimmune hepatitis, that was recently being treated with beta-lactam antibiotics because of streptococcal tonsillitis. A few days later she presented with an erythematous rash on the trunk and extremities. These lesions progressed to detachment and epidermal loss of >90% TBSA, sparing a small area on foot. Suprathel® was applied to all areas of epithelial loss, but perianal area and genitalia.

Results: The patient remained under sedation for 8 days due to pain. Full epithelization was observed 7 days after Suprathel® application, and the neo-epidermis was progressively exposed days later to prevent new lesions. The patient was discharged home after 17 days, after stabilization of all TEN manifestations.

Conclusions: Several materials have been described as effective in covering exfoliated areas, but skin substitutes are favored. Suprathel® is a synthetic skin substitute that in this case allowed for fast healing and recovery in a severe case of TEN. To the best of our knowledge, this case is part of a small number of cases involving almost all body surface area, and one of few successfully treated with Suprathel®.

Occlusive dressings for the treatment of wounds and burns in newborns

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Aim: to optimize the treatment of wounds in children of the first month of life.

Method: During 2022, burn center surgeons observed five newborns in different hospitals. 4 children were born full-term, one was premature. Three had burns with hot water, one had a chemical burn, one newborn had congenital aplasia of the skin. Treatment is aimed at preventing infectious complications and sepsis through antibiotic therapy and occlusive dressings.

Results: The burns were full thickness. Skin aplasia is a full-layer skin defect on the lateral surfaces of the body. The duration of treatment is from 28 to 41 days, by the 23rd day of treatment the area of wounds has decreased by 70%, by 30 days by 90%. Advantages of occlusive coatings: good protection from the external environment, wound visualization, sealing, creation of optimal conditions for the course of the wound process. The leading element of immune protection in the neonatal period is neutrophilic. In the imprints of wounds, a large amount of NG was found, but with incomplete phagocytosis, the digestive activity of NG was reduced. By the end of treatment, all had an inflammatory-regenerative type of cytogram, a decrease in the frequency of microflora isolation.

Conclusion: The use of occlusive dressings accelerates epithelialization, reliably protects against infection. In the first and second phases of the wound process, with the presence of significant exudation, it is necessary to apply hydrogel dressings in the third phase - a film cover.

Misleading burn injuries after lightning strike: the value of repeated clinical assessment for adequate local treatment

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Aims: Lightning strike injuries represent rare life-threatening clinical situations that sometimes include burn wounds, which may initially appear as more superficial than they actually are.

Methods: We report the management of a 17-year-old girl that was hit by lightning and thrown away from a rock while she was mountain trekking with her family. She suffered subsequent cardiac arrest resuscitated by her father. After initial assessment and first aid at a local hospital, she was transferred to the Plastic Reconstructive Surgery and Burns Department of the “Grigore Alexandrescu” Emergency Hospital for Children, Bucharest, intubated and machine-ventilated.

Results: Upon arrival, her assessment revealed 15% TBSA partial and full thickness burns localized on the face, neck, anterior trunk, bilateral groin areas, left knee, right calf, right anterior foot. She also presented Lichtenberg figures on the right thigh, bilateral pneumothorax, bilateral tympanic membrane perforation, neurological impairment and minor eye injuries. She was extubated 48 hours after admission. The case was managed by a multidisciplinary team. Regarding the burn local care, the third-degree lesions (1,5% TBSA) were excised and closed by local flaps and STSG. Most of the other burn areas healed conservatively. A second surgery was needed for a 0,5%TBSA area of the right ankle, 3 weeks after admission.

Conclusion: Lightning strike usually causes superficial burns and punctate areas of third-degree wounds that heal spontaneously. Nonetheless, regular burn depth reassessment is needed, since some cases may develop a slow healing pattern, requiring surgical excision and grafting in areas seeming more superficial at the beginning.

Characteristics of pediatric burns after earthquake in Turkey

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Aim: In this poster, demographic and clinical comparisons were made between the patients who applied to our Pediatric Burn Unit (group A) within 3 months from the first day of the earthquake in Turkey and the patients who applied in the same period last year (group B). We revealed the changing patient characteristics and discussed the preventive measures to be taken in terms of child burns after a similar earthquake disaster.

Methods: There were 64 patients in group A and 33 patients in group B ($p < 0.01$). There was no difference between the two groups of male-female ratios (1.2 vs 1.3; $p > 0.05$). Group A patients were found to be younger (17 vs. 34 months; $p < 0.01$). The scalding and contact burns were found to be higher in group A patients (45 vs. 15; $p < 0.01$, 16 vs. 6; $p < 0.01$). TBSA in group A was significantly lower (17 vs. 4; $p < 0.01$)

Results: In the post-earthquake period, younger children are burned by mostly with scalding and contact. However, it is noteworthy that the number of applications is close to 2 times.

Conclusion: These results tell us that families who started to live in tents and containers after the earthquake should be informed about scalding and contact burns. It is possible to do this by hanging the posters to be prepared and distributing them in the form of hand brochures and videos in the form of public announcements on television or social media.

prognostic effects of RDW on survival analysis of severe burn patients

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Aim: Severe burns (TBSA>20%), are associated with many deaths and complications that can have many economic, social and human burdens on burn victims. There are several factors to predict the severity of a burn injury. Here we investigated the predictive effect of RDW on survival analysis of severe burn patients.

Methods: This study was conducted over one year. We assessed age, sex, TBSA, burn depth, inhalation injury, days dependent on ventilator, length of hospital stay, CBC and RDW test values on days 1, 3 and 7 and final outcome.

Results: 104 patients were analyzed. 82 (78.8%) were male and 22 (21.2%) were female. The mean age was 41.4 years. in survivors, the mean RDW variable in the first, third and seventh days of measurement was lower compared to the deceased. At a significance level of 5%, a significant difference was observed between the means of this variable in the two groups (P=0.000). The mean of PLT variable in the first and third days of measurement was higher for surviving patients than for deceased patients. Difference between the mean platelets was not statistically significant (P > 0.05). The mean PLT variable on the seventh day of measurement was higher for surviving patients than for deceased patients.

Conclusions: This study showed that RDW and PLT count of the admitted burn patients are important predictors of severity and mortality of the patients.

Burns first aid: a review of common practices in the general population

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Aim: The purpose of this study is the identification and documentation of the first aid applied by patients immediately after burn, as well as the initial treatment used by other health professionals prior to patient referral to our department.

Methods: We included burns patients seen at the emergency department and outpatients' clinic from October 2020 until December 2022. Intubated patients were excluded. After completion of a questionnaire, we examined the type and length of the first aid applied and the instructions offered by other health professionals.

Results: In total we included 100 patients, the majority of whom suffered a thermal burn (91%). The first aid measures applied were running water (55%), immersion in water or wet compresses (5%), application of various substances (27%), while 23% of patients had not applied anything. The majority of patients (67%) were referred by another health facility from which only 20% had their burn treated with saline washout. For burns with TBSA >20%, running water was used by a significantly smaller percentage of patients ($p= 0.025$).

Conclusions: A significant percentage of the general population ignores that burn washout with tepid running water is the appropriate first aid treatment for a burn. Additionally, extensive burn area (TBSA>20%) is a risk factor for omitting this first aid method. Burns washout with running water is easy, accessible, and reduces significantly both burn depth and morbidity. This practice however, is not widely known and the general population needs to be informed and made aware of it and its value.

Development of delirium: association with old age and severe burns requiring intensive burn care (although not exclusively in intensive care)

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Title

Delirium is defined as a disturbance of the attention and awareness that develops over a short period of time, is a change from the baseline, and typically fluctuates over time. Burn care involves high prevalence of known risk factors for delirium such as sedation, inflammation, and prolonged stay in hospital.

Aim: was to explore the extent of delirium and the impact of factors associated with it for adult patients admitted for burn care in hospital.

Methods: Retrospective study, all adult patients admitted with burns during a four-year period. Daily records of the assessment of delirium using the Nursing Delirium Screening Scale (Nu-DESC) were analysed together with age, sex, the (TBSA%), operations and numbers of wound care procedures under anaesthesia, concentrations of plasma C-reactive protein, and other clinical variables.

Results: Fifty-one patients (19%) of the total 262 showed signs of delirium based on Nu-DESC recordings at least once during their stay in hospital. Signs of delirium were recorded in 42/89 patients (47%) who required intensive care, and in 9/173 (5%) who had standard acute burn care. Independent factors for delirium in the multivariate regression were: age over 74 years, number of operations and wound care procedures under anaesthesia, and the need for intensive care. Duration of hospital stay was 13.2 days longer in the group who had delirium.

Conclusion: We found a strong association between delirium and older age, the need for intensive care, and number of interventions under anaesthesia.

Guide to Address Gender Diversity in Burn Units

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Aim: based on a first study of Sexual/Gender diversity (2022), by the criteria and opinions of the burns care team, adding published guidelines and scientific reviews, design a Guideline of good practices in the admission and health care of people with sexual/gender diversity for the Burn Units

Methods: -A process for the creation of the Guide was designed in phases, initially considering a digital survey, distributed among all the personnel of the Burn Unit. The responses of the team, 48% of the total, confirmed the main items for inclusive clinical practices, based on the International LGBTQ+ guidelines.

-A preliminary draft of the Guide was written and submitted for peer review along with a focus group discussion of the material. It was also sent to a government office for LGBTQ+ people.

Results: With the results obtained, the final version was written. The text includes the factors of good practice and a glossary that facilitates the understanding of the specific vocabulary. also the updated bibliography and scientific evidence on these inclusive practices and how they favor the LGBTQ+ population

Conclusions: This guide is the first, according to the consulted bibliography, that considers specific care for LGBTQ+ people in the Burn Unit. One aspect that must be included is the review by the people of this group, for its definitive validation. This aspect is still pending.

Evaluating the level of posttraumatic stress in burn patients hospitalized in the plastic surgery and burns clinic

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Aim: A burn injury can be a traumatic experience with both physical and psychological consequences, so the aim of this paper is to evaluate the level of stress of patients with burn injuries and to identify the most common symptoms of PTSD.

Methods: The methods we used are both qualitative and quantitative. Thirty adults, aged 16-65 years, with burn injuries were included in the study so far and they all signed informed written consent. They were given, during hospitalization, the PTSD Checklist for DSM-5 Standards and asked to choose one of the five possible answers.

Results: Six patients met the criteria for PTSD, meaning 20% of all patients, twenty-two patients experienced various symptoms, but did not meet the criteria and two patients experienced no symptoms at all.

Conclusions: Despite a limited evidence base, the results may detect a high number of patients facing symptoms. It is essential to highlight the importance of normalising the patients' response to burn injury and help them identify and explore their feelings.

Digitalizing burn injury rehabilitation: exploring the potential of online support interventions for recovery and psychological well-being

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Aim

To explore the lived experience of people affected by burn injuries and use the data to create a burn-specific web resource on Healthtalk.org.

Methods

A qualitative approach using semi-structured interviews with questions about their experiences of having a burn, or parenting a child with a burn. Analysis of data using Braun and Clarke's six steps of thematic analysis.

Results

Interviews were conducted either online or over the telephone. 36 interviews were completed (11 people burnt as an adult, 13 people burnt as a child, and 12 parents of children with burns). The data was coded using Braun and Clarke's six steps of thematic analysis. The OSOP (one sheet of paper) method of analysis was then conducted and broad themes were identified. In all, 23 topic summaries were created under 5 broader headings: burn circumstances, treatment and services, living with a burn, adjusting to life with a burn, and information and support. Write-ups of each topic summary aimed to reflect the shared experience of those interviewed; these were accompanied by the corresponding interview clips, which will be displayed on the Healthtalk website.

Conclusions

The interview data demonstrated that although the experience of having a burn is unique to the individual and there are nuances of treatment and impact, there is still an underlying shared experience between those with a burn. The creation of a burn injuries Healthtalk module aims to reflect these shared experiences to provide people with a sense of peer support in the form of an online intervention.

Innovative solutions for rehabilitation of face burn victims in humanitarian contexts: descriptive cohort analysis in two different settings in Gaza and in Jordan

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Aim: Two humanitarian patient cohorts were described, interesting facial burn victims treated with transparent facial orthosis using 3D technology, among multidisciplinary care.

Methods: Access to specialized burn rehabilitation is rare in humanitarian contexts, leaving victims with major sequela. Médecins Sans Frontières is providing burn care in Gaza and in Jordan. 3D technologies and telemedicine have been used to facilitate provision of customized and adapted compressive masks in these projects, one treating post-acute phase (Gaza) and one post-reconstructive surgery patients (Jordan).

Clinical outcomes were analyzed for patients who completed 6 month or 1-year treatment. Scores from Vancouver Scar Scale (VSS) and Patient Scar Assessment Scale (POSAS) were collected at various stages of the treatment, among patient satisfaction regarding the orthotic (OPUS) and daily wearing time of the device.

Results: The cohort gathers 73 patients in Gaza and 30 in Jordan, mainly children (80.8%/66.7%) and domestic burns victims (76.7%/73.3%). Orthoses were similarly provided in delay of 23.6 days following initial assessment and were worn daily 13h21min average. Clinical improvement was observed in both groups: the reconstructive phase cohort showed a higher decrease in VSS (39.35% vs 29.41%), whereas post-acute phase cohort presented a higher decrease in POSAS (40.28% vs 25.51%). Patients reported a satisfaction rate of 97.4% in Gaza and of 94.4% in Jordan.

Conclusions: Positive outcomes were observed in both cohorts, in different proportions for scars evolution inherent in the stages of care. It shows the beneficial impact advanced and specialized treatment have, even on patients living in various challenging settings.

Brain lightening in the large burns: no time to loose time

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AIM: Critical illness-related polymy- and polyneuropathy (CIM and CIN, also mentioned as ICU acquired weakness, ICU-AW) is a common complication accompanying large burns. It severely impairs quality of life for many years after discharge. Existing preventive measures have not been significantly effective when done in unconsciousness patients (i.e. passive or electrically stimulated rehabilitation) emphasising the necessity of the active brain involvement.

METHODS: To introduce a novel physiotherapy plan for the large burns allowing brain activation consisting of combination of:

- Early verticalisation
- Illusory movements
- Repetitive transcranial magnetic stimulation
- Sedation without benzodiazepines and/or propofol
- Virtual reality
- Eye-trackers and robot-assisted therapy

and their implementation and timing.

RESULTS: First experience with the brain lightening programme in patients with deep burns > 30 % TBSA is discussed.

CONCLUSIONS: Modern methods of the brain activation are to be used in preventing CIM and CIN in the large burns.

Is the Brief Fatigue Inventory a reliable and valid assessment tool for Swedish burn patients? Preliminary results

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Aim: The aim is to validate Brief Fatigue Inventory (BFI) for burn injuries in a Swedish population.

Methods: All patients booked for follow-up at the Burn center's outpatient clinic in Uppsala 6 months after burn injury were asked to participate in the study. The inclusion criteria were (a) ≥ 18 years; (b) treated internally at the Burn unit at least 24 hours and (c) managed Swedish verbally and in writing. Exclusion criteria were (a) any underlying disease that obstructed the completion of the questionnaires, or (b) the patient chose not to attend the 12-month follow-up.

Two self-assessment scales were administered to the included patients: Fatigue Severity Scale (FSS), which is translated to Swedish but not yet validated for burns, and the Brief Fatigue Inventory (BFI), valid and reliable for burns but not yet validated in a Swedish population. The assessments are filled out at two time-points: 6 and 12 months after burn injury. The study started in May 2020 and by the end of 2023 we plan to have seventy patients enrolled.

All the included individuals have given their informed consent and the study was approved by the Swedish Ethical Review Authority (Dnr 2020-00387).

Results: We expect the results to show that BFI is a reliable and valid assessment scale, also in a Swedish cohort. The study is ongoing and preliminary data will be presented of the patients that conducted both follow-ups so far.

The reliability and validity of a marker-based system for measuring joint range of motion in burn scar contracture patients

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Aim: This study aims to evaluate the reliability and validity of a marker-based system for measuring joint range of motion in burn patients with hypertrophic scar-related joint contractures.

Methods: A study was conducted to measure the range of motion (ROM) for the upper extremity in 48 participants. These participants had joint contractures due to hypertrophic scars after thermal injuries. The evaluation procedure began with a warm-up period and three familiarization trials for each measurement. We measured the active range of motion for each joint using a goniometer and a marker-based system with 8 infrared cameras. Participants wore reflective markers and were evaluated twice, one week apart. The motion capture system formed a skeleton model through a dynamic view, allowing for sequential measurement of ROM for each joint. The study measured ROM for the dominant side of each participant.

Results: No statistical differences were found between the ROM measurements obtained by the two methods, for all joints measured. The intra-rater reliability of the marker-based system was acceptable for clinical use in all ROMs of shoulder, elbow, and wrist.

Conclusions: The results suggest that the marker-based system can be used as an alternative to the goniometer for measuring ROM in the clinical setting, with acceptable intra-rater reliability.

Clinical Utility of a Exoskeleton-Robot Training In Patients with Septic Arthritis After Thermal Injury : Case Report

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Aim : Infections of bones and/or joints are uncommon, but delayed diagnosis or improper treatment can result in irreversible joint destruction. Early diagnosis and effective treatment are necessary for avoiding severe outcomes. There is no institution that provides clear protocols for septic arthritis (SA) rehabilitation, and there are few studies on physiotherapy. Although rare in patients with major burns, there are cases where SA is diagnosed. In this study, the researchers tried to confirm the clinical effect of robot training in SA patients caused by burns.

Methods: Two participants were diagnosed with SA after electrical burns. They are unable to walk due to joint pain, limitation of range of motion (ROM), and muscles weakness before training. Throughout the training program, Rebliss® (H-ROBOTICS, KOREA) setting were individually set according the functional level of each patient. The ROMs of the joint to be exercised (knee joint or ankle joint) is evaluated, and then the ROM of motion is set. Depending on the degree of muscle strength, it is set to active mode or passive mode to perform strength training and ROM exercise. The patients underwent 30 minutes of robot training with 30 minutes conventional therapy, 5 days a week for 8 weeks.

Results: After training, gait function and pain score were improved without adverse effect on joint ROM and muscles strength.

Conclusions: In this study, it was found that the robot training for patients with SA results in an improvement of gait function without deteriorating joint ROMs and muscle strength.

Physical fitness after burn injury remains decreased even in the long term: results of follow up after burn rehabilitation

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Aim

Severe burn injuries can result in relevant restrictions of physical capacity. Research is increasingly focusing on the general long-term consequences of burn victims.

Methods

In a prospective trial to investigate the effectiveness of a burn rehabilitation concept, we also examined general physical capacity. Burn victims were comprehensively assessed before and after rehabilitation and after 3 and 12 months. A bicycle ergometer test was used to measure general physical capacity (Physical Working Capacity, PWC150).

Results

103 patients with a mean age of 44 years and a mean TBSA of 14.55% were enrolled. The use of beta-blockers was defined as an exclusion criterion, therefore the test was not performed in 18.4%, 17.5%, 10.4% and 9.8% at the different time points. Only a part of the participants reached individual target workload. In about a quarter of the subjects, the test was discontinued due to exhaustion. The majority of participants showed a reduction in general physical capacity (exhaustion or below-average results) in 70.4%, 75.9 %, 63.9 % and 70.4 %. A slight correlation was found with TBSA and length of stay.

Conclusions

The PWC150 shows a persisting limitation of general physical performance in the majority of rehabilitants. This indicates that reduced fitness may still persist for a long time. The exclusion criterion of taking beta-blockers excludes the severely affected patients. This means that the impairment would probably be even greater in the whole sample. Further studies should follow to analyze influencing factors and the effectiveness of treatment.

Early exercise training following severe burn injury: A randomised controlled trial in China's largest burn center.

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AIM

To investigate the potential of exercise training administered during the acute phase of severe burns on muscle wasting and quality of life.

METHODOLOGY

Adults ≤ 65 years with burns $\geq 40\%$ TBSA, recruited at the Department of Burns in Wuhan, China, were randomly allocated to either receive standard care (n=29), or additionally exercise training (n=29), consisting of resistance and aerobic training 3-5 times per week. Exercise was commenced 8 days [IQR 5-9] after admission and lasted between 6-12 weeks depending on hospital discharge. Ultrasound-derived quadriceps muscle thickness (QMLT), rectus-femoris cross-sectional area (RF-CSA) lower limb muscle strength, BSHS-B and EQ-5D-5L were assessed at baseline, after 6 and 12 weeks. Mixed regression models were used to analyse between-group changes over time.

RESULTS

Data from 58 subjects (42 [95%CI 40-45] years; 40-94%TBSA range; 86% previously mechanically ventilated) demonstrated a higher retention of QMLT and RF-CSA after 6 weeks (RF-CSA: β -coeff.: 0.05cm², p=0.045) and a faster recovery from 6-12 weeks (RF-CSA: β -coeff.: 0.04cm², p=0.016) as a result of exercise. Early exercise led to a 19.5% larger increase in lower limb muscle strength between 6-12 weeks than standard care alone (p=0.001). Besides a significant effect for the BSHS-B domain 'affect' from 6-12 weeks, group allocation did not significantly impact the assessed quality-of-life parameters. Few minor adverse events were reported in the exercise group.

CONCLUSION

The results of this study lend support to the inclusion of exercise as an essential part of the acute management of postburn muscle wasting in adults with severe burn injury.

Prospective, single-centre randomised controlled study for the effects of microcurrent therapy on the prevention and healing of brachioplasty scars: preliminary results

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AIM

We aim to investigate the effect of microcurrent therapy in patients after bilateral brachioplasty surgery.

METHODS

To date we enrolled 16 patients of which 9 patients completed all assessments. One arm was randomised in the intervention group and the other arm in the control group. Both groups received standard wound care and hydration. The intervention group received additionally microcurrent therapy for 6 weeks. Scars were measured at baseline, after 3 months and 6 months for colour (Mexameter®), hydration (Corneometer®), elasticity (Cutometer®) and POSAS 2.0. Statistical analyses included a general linear mixed model and paired sample t tests.

RESULTS

No significant group differences were found over time for objective measurements. However a positive trend was observed after 3 months for elasticity in the intervention group, compared to a decrease in elasticity within the control group.

For POSAS-patient, a significant improvement was observed after 3 months for itching, colour, texture, global opinion and sum of scores ($p \leq 0.048$). Analyses for POSAS-observer showed a significant improvement after 3 months for pliability, surface, global opinion and sum of scores ($p \leq 0.040$).

CONCLUSIONS

The positive trend for elasticity is confirmed by POSAS-observer pliability. The lack of significant differences in objective measurements might be due to the relatively short treatment period and small sample size. Therefore we aim to expand our sample size to 20 patients. Microcurrent therapy might be useful and safe to start already in an early stage after wound closure after brachioplasty. It would be advised to continue microcurrent treatment over a prolonged period.

Personal and Public Involvement in developing a health literate scar treatment website

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Aim

Our aim is to develop an informative website 'howtotreatscars.com' for patients with burn scars who are looking for treatment options for their scars and evaluate whether this website meets health-literate criteria.

Method

Patients and caregivers completed 5 questionnaires including 3 subdomains: knowledge transfer, treatment-plan agreement and health-literacy aspects. These questionnaires assessed changes in scar-management knowledge, together with the accessibility and user-friendliness of the website for which the Patient Education Materials Assessment Tool (PEMAT) was used. One questionnaire also investigated the agreement between patient and caregiver in their search for the best treatment option(s).

Results

Out of 20 respondents 66% of the patients never received scar treatment in a specialised aftercare centre. Almost half (43%) of the patients performed a search for treatment options on the internet before visiting their caregiver.

All respondents can be considered digitally literate.

Related to knowledge transfer we noticed a statistically significant improvement ($p = .004$) of the knowledge assessment after visiting the website compared with the pre-visit assessment.

Ninety-one % of the patients and their respective caregivers agreed on the best therapeutic solution(s).

The PEMAT score was 96%, but 15% of the respondents indicated the usage of too much medical jargon. All respondents found the website well-designed and user-friendly.

Conclusion

The website induced knowledge transfer, treatment-plan agreement, is user-friendly, well-designed, with a high PEMAT score. The remarks on medical jargon encouraged us to develop a 2.0 version of our scar treatment website on content level in co-creation with patients and caregivers.

Reconstruction of the cervical region in patients with severe postburn contractures using free flaps: a case report

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Aim: To describe our experience with a case of severe postburn contractures in the cervical and inferior facial regions causing debilitating functional deformities.

Methods: A 48 year old woman who suffered third degree burns of the upper body including face, neck, thorax, abdomen and upper limbs was referred to our Burn Unit for treatment. The management of the acute phase consisted of various sessions of enzymatic and mechanical debridement and posterior coverage with split-thickness skin grafts. One year after hospital discharge she developed a severe mentosternal contracture causing eversion of the lower lip with eating dysfunction associated to an important reduction of the cervical range of motion. Initially a full-thickness scar excision was performed and a synthetic double layer dermal matrix combined with a split-thickness skin graft was used for the coverage of the skin defect. Due to unsatisfactory results in the postoperative with recurrence of the mentosternal contracture a new reconstruction with a SCIP free flap was performed.

Results: Six months after the surgery the patient is able to realize a full extension of the cervical region. The lower lip eversion was corrected and the patient presents a normal oral function.

Conclusion: The primer aim of the facial and cervical postburn reconstructions is to restore the function of the affected areas optimizing at the same time the aesthetic outcomes(1). Due to its dermal qualities and low donor site morbidity, the SCIP flap is a good option for this type of reconstructions when there aren't any other loco-regional options available(2,3).

A breakthrough in eyelid reconstruction: the use of pure skin perforator flap in severe facial burns.

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AIM:

Scarring of the eyelids after severe facial burns can cause several complications, including incomplete eyelid closure and corneal exposure which can ultimately lead to keratitis, corneal opacification and visual impairment. The gold standard treatment with skin grafting and tarsorrhaphy can sometimes result in poor graft survival, hypertrophic scarring and graft contraction, which doesn't resolve the problem.

The pure skin perforator flap is a recent breakthrough in the field of reconstruction. It presents the anatomical characteristics of a full-thickness skin graft while preserving the benefits of a vascularized free flap, allowing no flap contraction and complete survival of the skin grafted.

METHODS:

We describe the case of a 50-year-old patient affected with severe burns to 22% of the body and face, resulting in recurrent bilateral ectropion despite various skin graftings to both upper eyelids.

RESULTS:

We performed bilateral replacement of the upper eyelid skin in two different procedures, one for each eyelid, using a pure skin perforator flap obtained from the groin, anastomosed to the superficial temporal vessels in the left eye and the supraorbital vessels in the right eye. This approach yielded successful results, and the patient achieved complete closure of both eyelids without any complications.

CONCLUSIONS:

In conclusion, the pure skin perforator flap is a viable option for eyelid reconstruction in patients with severe facial burns. It offers several advantages over grafts, such as preserving the vascular supply to the graft and no contraction, making it an excellent choice for extensive eyelid reconstruction.

Combination Treatment Using Nonablative Fractional Laser and Intralesional Triamcinolone Injection for Hypertrophic Scars and Keloids

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Aim: Combinations of various treatment methods were shown to be more effective than monotherapy when treating hypertrophic scars and keloids. This study was conducted to assess the effectiveness of combination therapy with non-ablative fractional laser and intralesional steroid injection.

Methods: A total of 38 patients with hypertrophic scars or keloids were evaluated. The control group of 21 patients received steroid injection alone, and 17 patients (the combined group) received 1550-nm erbium-glass fractional laser and steroid injection simultaneously. All treatments were scheduled every four weeks. The results were evaluated by analyzing the total number of treatment sessions, Patient and Observer Scar Assessment Scale (POSAS), recurrence rate and remission period.

Results: The mean number of treatment sessions was statistically fewer in the combined group than the control group (6.95 vs 5.47, $p=.042$). There was a significant difference in the patient's scale in the combined group (14.62 vs 22.82, $p=.005$); however, observer's scale score showed no significant difference (17.92 versus 20.55, $p=.549$). Total score showed the same tendency as in patient's scale (32.54 versus 43.36, $p=.041$). The recurrence rate was 38.1% (8/21) and 35.3% (6/17), in the control and combined group respectively with no significant difference ($p=.859$). However, the mean remission period was statistically longer in the combined group (3.00 months vs 4.17 months, $p=.042$).

Conclusions: Combination therapy with non-ablative fractional laser and intralesional steroid injection showed better results for the treatment of hypertrophic scars and keloids with fewer treatment sessions, better patient satisfaction, and longer remission periods.

Distal ulnar artery fascial flap - vascular study and surgical considerations

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Aim: The distal ulnar artery flap is a fasciocutaneous flap raised on the ulnar side of the wrist and forearm. Its axial pattern of vascularisation is based on a cutaneous branch of the ulnar artery.

Methods: We performed the surgery on five patients using the distal ulnar artery fascial flap: three patients were operated due to palmar burn scarring, one patient was operated by using the wrap-around flap of the median nerve for better regeneration and one patient was operated by using the gliding flap in the wrist area. Our study was additionally supported by a cadaveric dissection study of fascia vascularisation with contrast material.

Results: Our clinical practice has found the fascia to be an excellent gliding flap for tendons and wrap-around flap for the median nerve. The flap is used for resurfacing in cases such as burn scar resection and fingers contracture release. In combination with dermal matrix and sequenced with skin graft the flap was proved to be very suitable.

Conclusions: Depending on indications of selected patients we employed the fascial flap as a method of choice. A simple arc rotation of the fascial flap combined with epifascial soft tissue layer permits the coverage of the palmar-dorsal region of the hand. Subcutaneous tissue should be left on the fascia as the deep fascia is included in the flap.

EVALUATION OF HEALING WITH THE USE OF CELLULOSE SUBSTITUTE (EPICITE) IN PATIENTS WITH DEEP SECOND-DEGREE BURNS

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Objective: A study comparing healing between regenerated cellulose skin substitutes (EPICITE) and xenograft was performed in patients with second-degree burns.

Methods: The report of 60 cases evaluated in a hospital in Peru was presented; between January 2018 and December 2022 in patients between 1 and 60 years of age, without comorbidities, where the evaluation of healing in patients with second-degree burns with hot liquid is recorded. It is a comparative, intervention, analytical, prospective, and longitudinal study. Where the two skin substitutes were used at the same time in all patients, this study has the authorization of each patient through informed consent.

Results: At 90 days an evaluation was made, resulting in better healing with the synthetic cellulose skin substitute (EPICITE) compared to xenograft; having evaluated the healing results with the Vancouver scale (vascularity, pigmentation, flexibility, and height); being the results with synthetic dermal cellulose substitute less redness, greater elasticity that are the most prevalent indicators.

Conclusions: The study showed that the synthetic cellulose skin substitute is an important alternative that favors the quality of healing in burn areas; being more efficient than the xenograft, when being evaluated and compared in its four parameters with the Vancouver International Healing Scale. The result shows that (EPICITE) is an efficient alternative in the treatment of second-degree burns; favoring a better healing process.

Management of full-thickness skin defects due to high-energy trauma - five year clinical experience with the acellular dermal substitute

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Aim: To analyze prospectively the efficiency of acellular dermal matrix applied to full-thickness skin defects due to high-energy trauma.

Methods: Retrospective review between August 2018 and December 2022 covering 28 patients with full-thickness skin defects of the upper and lower extremity, treated with the acellular dermal substitute and unmeshed skin graft in a single-step procedure.

Results: 28 patients were enrolled in this study. Mean age was $21 \pm 14,29$ years. Causes of the defects: degloving injury and high-energy trauma. The size of soft tissue defects was between 50 and 500 cm². No complications or inflammatory response in all cases but 3, which resulted in a seroma. All wounds were epithelized within 11 days without additional grafting. The overall survival rate of the matrix and the skin graft was 97%. The average VSS was 1.97.

Conclusion: High-energy trauma is caused by force (traffic injuries, crush, workplace accidents etc.). High amount of kinetic energy is applied to the tissue. Managing of those kinds of injuries is complex and requires careful planning to provide stable coverage by the safest and least invasive method. Acellular dermal substitute represents a valuable alternative to other types of defect coverage and should be considered in the treatment of skin injuries.

Keywords: acellular dermis, artificial skin substitutes, high-energy trauma, soft tissue defect

Enzymatic debridement with Nexobrid® in deep facial burns: Our experience in Vall d'Hebrón hospital burn unit

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Aim: One of the most frequent site of burns is face and neck with a prevalence between 27 to 58%. Due to the importance of these anatomical territories in aesthetic and functional terms, it's important to preserve the maximum amount of viable dermis to improve the quality of the scar process. Enzymatic debridement has revolutionized the management of deep burns, showing favorable results in the literature. Despite this, to date there are few publications regarding the management of facial burns with enzymatic debridement (Nexobrid®) and subsequent wound treatment.

The objective of the study is to present our experience with enzymatic debridement (Nexobrid®) in deep facial burns.

Methods: From December 2019 to March 2023, 11 enzymatic debridements with (Nexobrid®) have been performed on patients with deep facial burns in our burn unit.

Results: Data from 11 patients (7 men and 4 women) were collected. Mean age was 43 years. The most frequent etiology of burns was flame (9). In all patients, a single session of (Nexobrid®) was performed. The wound care protocol applied was honey in 10 of 11 patients. 8 patients epithelialized spontaneously, with a mean epithelialization time of 23 days. The other 3 need surgery only at third degree burn areas.

Conclusions: Enzymatic debridement with subsequent wound care protocol with honey has proven to be a safe and effective option in treatment of deep facial burns, allowing spontaneous epithelialization in up to 73% of patients

A novel personalized burn treatment:

In-situ electrospun nanofibers 3D scaffold with cultured autologous keratinocytes

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Aim: We present the case of a 26-year-old male with full thickness burns covering 98% of his total body surface area. We propose a novel personalized burn treatment approach, In-situ electrospun nanofibers 3D scaffold with cultured autologous keratinocytes.

Methods: We sprayed in-situ electrospun polymer nanofibrous matrix (EPNM) directly on cultured epithelial autografts (CEA) areas. In addition, we propose a personalized treatment, on hard-to-heal areas, in which we sprayed suspended autologous keratinocytes integrated with in-situ 3D EPNM directly onto the wound bed. This method enables the coverage of larger wound areas than possible with CEA.

Results: We were able to show that this treatment approach resulted in good epithelization, seen as early as seven days post CEA grafting, with complete wound closure within three weeks, and to a lesser extent in areas treated with cell spraying. Moreover, in-vitro experiments confirmed the feasibility of using keratinocytes embedded within the EPNM: cell and culture viability, identity, purity and potency were determined.

Conclusions: These experiments show that the skin cells are viable and can proliferate within the EPNM. The results presented herein are of a promising novel strategy for the development of personalized wound treatment, integrating on-the-spot "printed" EPNM with autologous skin cells, which will be applied at the bedside, over deep dermal wounds, to accelerate healing time and wound closure.

The Meek micrograft technique in a Romanian functional burn center

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Aim: The aim of the presentation consists of raising awareness of the clinical application of the Meek micrograft technique on difficult to manage patients.

Methods: The paper illustrates four cases of patients with burned lesions, less than 25% total body surface area, admitted to a Romanian Functional Burn Center, with limited therapeutical options. The Meek micrograft technique was applied in combination with the Mesh skin grafting.

Results: All patients had good outcomes, despite their difficulty in understanding the explained information and the suggested surgical treatment, with fast healing of their recipient sites, decreasing the infectious and systematic complications associated with burns. This way, they experienced an alleviation of their functional, esthetic and emotional status, also by improving their cooperation with the medical team.

Conclusions: The Meek micrograft technique might be associated with the Mesh skin grafting in non-cooperating patients, as an useful tool to increase the survival rate.

Using cryopreserved cultured cutaneous allograft in the surgical management of extensive burned patients

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Aim

To assess the re-epithelialization time of donor and mesh skin areas covered with cryopreserved cultured cutaneous allograft in patients with extensive burns

Methods

Records of patients treated with extensive burns that have an indication for surgical excision and skin grafting covered with cryopreserved cultured cutaneous allograft. Donor site areas taken from limb and torso calibrated between 0.008 and 0.015 inch and 4 x 6 inch wide. Graft expansion ratio for burns requiring skin grafting 1:1.5 < 11% TBSA, 1:3 between 11 and 20% TBSA and 1.6 or 1.9 for TBSA superior to 20%. Re-epithelialization time, infection rate, complications were recorded. Exclusion criteria: patients with previous immunosuppression or diabetes mellitus

Results

53 files of patients were included. The donor site areas were limbs (82%) and torso (18%). Average healing time required for donor site such as limbs and torso were 7.32 ± 0.13 and 8.04 ± 0.54 days respectively. The time for complete restoration of meshed skin were 9.03 ± 2.3 days for 1:1.5 expansion ratio, 10.5 ± 1.69 for 1:3 and 13.4 ± 2.0 for 1.6. No 1.9 expansion ratio were collected. 4 cases with graft loss. 2 cases with presence of infection

Conclusions

The use of cryopreserved cultured skin allografts in the donor site of dermal-epidermal skin grafts allows faster re-epithelialization for new grafts. It also demonstrates its effectiveness on faster full restoration of mesh areas and prevents from infections, being a great option in the surgical management of extensive burned patients

Acellular and Lyophilized Fish Dermis for the Management of the Open Abdomen

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Aim

Management of the open abdomen is challenging and may carry significant morbidity including entero-cutaneous fistula formation. Biologic and synthetic skin substitutes may allow the development of an optimal wound bed for grafting or provide temporary wound coverage. The ultimate goal is to achieve an ideal skin substitute that provides an effective and scar-free wound healing. Decellularized and lyophilized north Atlantic cod fish skin is a promising alternative as seen in this case series.

Methods

A 32-year-old female with history of alcohol abuse and cirrhosis presented in multiorgan failure, septic shock, abdominal compartment syndrome. She underwent a decompressive laparotomy and subsequently abdominal closure with a Vicryl mesh. 51-year-old female underwent a liposuction complicated with bowel injury resulting in a NSTI and septic shock. She underwent multiple wide debridements and subsequently abdominal closure with a vicryl mesh. Lastly, a 76-year-old female underwent a sigmoid resection with Hartman's colostomy for perforated diverticulitis. She experienced fascial dehiscence. All these abdominal wounds with underlying bowel were resurfaced with Xenograft and subsequently autologous STSG.

Results

Xenograft integration and optimal granulation tissue was evidenced in >95% of the surface area as early as 5 days after the product application. This was considered ideal for resurfacing. Skin coverage with meshed STSG revealed nearly 100 % skin graft take in all the cases.

Conclusions

Decellularized and lyophilized fish dermis may provide an excellent option for wound coverage and to enhance the formation of the optimal wound bed for grafting. Further experience may be added to replicate this findings.

Use of collagen elastin in bite wounds in psoriatic patients

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Aim

Psoriasis is a systemic, chronic inflammatory process in the skin, the use of oral and topical corticosteroids to reduce the progress and impact that these lesions produce in our patients is very common.

Wound healing in them is slow and torpid, producing a deterioration in the quality of life and social relationships.

The objective of this presentation is to propose a new non-surgical tool in this type of patients with complex wounds.

Methods

We present a case of two patients with sequelae of canine bite in the lower limb, post-autograft and total loss of the same in both cases. Chronic wound lasting approximately 1 month, we proceeded to perform topical cures with use of MatriDerm and changes every 10 days

Results

total closure of the lesion in 40 days.

Conclusions

MatriDerm is a one-step dermal substitute for full thickness skin defects in combination with autograft. MatriDerm consists of a type I, III and V bovine collagen fiber sheet that incorporates elastin hydrolyzate that is converted to collagen in the weeks after application. The matrix can be stored at room temperature and is presented in 1 mm, 2 mm, 3 mm thick sheets. There is no description of an exposed collagen and elastin matrix for wound closure. An option is presented for the closure of complex wounds in which the possibility of grafts or flaps does not exist due to their comorbidities or due to tissue conditions such as long-term psoriasis

Fish to replace deep wound defects

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Purpose of the study

Tinea capitis is a dermatophytosis of the scalp whose transmission is by humans or animals. The clinical appearance can range from seborrheic dermatitis to kerion. The treatment is long with oral antifungal associated with shampoo. We report a case of inappropriate incision/excision of a kerion and the use of Kerecis® as dermal and epidermal substitute to cover the incised area. A case of Verneuil disease with large excision of the skin is also reported with the use of Kerecis® to cover the incised area.

Methods

A seven-year-old patient was diagnosed with an abscess of the scalp. Incision was done by a dermatologist with a final diagnosis of Trichophyton mentagrophytes. The evolution was unfavorable with significant loss of substance of the scalp. In order to attempt a primary closure of the scalp, we apply a dermal substitute based on fish skin, Kerecis®, rich in Omega 3 polyunsaturated fatty acids. A large excision of the skin was realized in a fat young women suffering from Verneuil disease with the use of Kerecis® as dermal and epidermal substitute to cover the incised area.

Results

After two to three applications of the fish substitute and multi-weekly dressings, the defects of the scalp (case 1) and of the axillary area (case 2) diminished with a reduction of the defect and closure of the skin.

Conclusion

Kerecis® is a therapeutic alternative in the treatment of loss of substance in children.

Enzymatic debridement with bromelain for chemical burns: case report

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Introduction: bromelain consists of an enzyme, which selectively removes the eschar of mid- to deep-thickness burns and leaves a suitable bed that facilitates spontaneous re-epithelization. While it is widely used to remove the eschar of burns caused by fire or heat, there is limited experience and, therefore, limited literature about the use of bromelain for chemical burns.

Aim: we describe the results of the use of bromelain for enzymatic debridement of a chemical burn.

Methods: our patient presented a third degree burn that extended from thorax to abdomen (4% of the total body surface) and other burns of diverse severity in different parts of the body, including the face, right arm and hand, left arm and both thighs. The total body surface burned was 8%. The mechanism of the burns was chemical with sulfuric acid due to a work accident. After 24 hours of wet dressing with Prontosan, we applied 7 gr of Nexobrid in 4% of the body surface (thorax and abdomen). We removed Nexobrid after 4 hours and new wet dressing was applied. Definitive dressing was done with Mesitran.

Results and conclusion: the use of bromelain is suitable for the enzymatic debridement of chemical burns, even though studies that compare its efficacy to other type of debridement and further literature is needed to confirm its applicability.

Reverse circumcision, a novel technique for skin coverage in patients with circular burn in the shaft of the penis

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Purpose: There are various techniques described for coverage of penile body defects such as partial thickness skin grafts, use of dermal matrices, use of locoregional flaps up to radial free flap. These procedures are not innocuous since they generate secondary defects, aesthetic alterations and sensitivity. Therefore, we present our technique for the use of excess foreskin as a sensitized skin cover.

Methods: A 40-year-old male patient, who presented an electrical burn of 30% TBSA. He presents circumferential burn of the penis 4 cm length. Surgical debridement of the skin from the shaft of the penis to Buck's fascia is performed, generating a defect of approximately 4 cm in circumferential skin height, the foreskin is proximally pulled, uncovering the glans penis, the defect is completely covered circular. The base of the penis is sutured with 3-0 monocryl in the subdermal plane with a simple inverted stitch and in the epidermal plane with 3-0 monocryl, simple stitch. The shaft of the penis is covered with a Vaseline dressing and a secondary dressing.

Results: The patient's penis is discovered 24 hours later, evidencing vitality of the skin of the shaft of the penis, with no signs of hematomas or seromas. The patient reports maintaining sensitivity of the skin of the shaft of the penis from 7 days after surgery, without micturition alterations or in sexual function.

Conclusions: Our reverse circumcision technique is a simple technique that should be considered primarily in any center when faced with skin defects of the shaft of the penis

Use of polylactic acid dressing in donor areas of skin graft patients with severe burns to improve their recovery

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Purpose: Major burn patients (>40% TBSA) have few skin injection donor areas for skin coverage, therefore unusual areas such as soles of feet and scalp are taken. The rapid recovery of these areas limits the waiting times between surgery and surgery, which is why new strategies are sought to improve the recovery process in these patients. We present an example of the use of polylactic acid dressing in these patients.

Methods: A 38-year-old female patient, who presented a 60% fire burn, a history of multiple surgeries where tangential excision was performed and skin graft was taken and applied. However, she does not present usual graft donor areas, so the scalp is shaved and partial thickness skin grafts are taken. An 18 x 23 cm sheet of lactomer-capromer (polylactic acid) is applied, fixed with surgical steel staples and covered with vaseline dressing, gauze dressing and bandage.

Results: The patient was found in the operating room to perform surgery on the grafted areas, showing complete epithelialization of the scalp after 7 days.

Conclusions: The use of lactomer-capromer dressing (polylactic acid) improved the epithelialization process of the skin donor area, once again allowing partial thickness grafting in patients who need to accelerate the healing process with scarce skin donor areas

Post-trauma, non-healing lesions of the leg, treated with a new debriding compound: a retrospective proof-of-concept study.

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Aim:

A new debriding compound (TDA) is designed to rid a wound of biofilm and necrosis in a one-time intervention, leading to faster granulation tissue development and subsequent healing by secondary intention or grafting. TDA is primarily designed for the treatment of ulcers, but the compound was also tested in post-trauma, non-healing (PTNH) wounds.

Methods:

In a retrospective study the results of a one-time application of TDA were assessed. TDA was applied once with vaseline gauze treatment afterwards. Primary outcomes studied were time to complete granulation and adverse events. Time to reepithelialisation was also assessed.

Results:

Nine lesions in nine out-patients (average age: 77,9 years) were studied. Lesions were 15,9 cm² and 5,6 months old on average and located on the lower leg.

Average time to complete granulation was 34,1 days and time to reepithelialisation was 69,8 days, with 11,9 visits on average to the clinic . There were no adverse events.

Conclusion:

Typically, PTNH lesions take much time to heal and require many interventions. This study showed that a single TDA-treatment with subsequent "neutral" dressings leads to healing in a relatively short time, with few clinic visits. The latter aspect may also result in overall cost reductions. We extrapolate and hypothesize that TDA treatment also might be effective for the treatment of old, non-healing burns, and those full thickness burns that are too small to surgically excise. The fact that TDA can be used in the outpatient clinic or even in home care is an additional advantage.

REVERSE TECHNOLOGY IN THE TREATMENT OF BURNS: THE USE OF TROPICAL FRUITS

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Aim and Methods: We describe how traditional African medicine plays a major role in the treatment of burn injuries in most regions in Africa. While honey is mainly used for its antiseptic effect, other products such as papaya (*Carica Papaya*) are used to clean full thickness wounds of infection and debris or to treat wounds with hypergranulation. The pulp of mashed papaya is applied on a dry gauze daily or every other day.

Results: Papaya appears to be effective in wound debridement, prevents infection, and stimulates the development of a granulating wound suitable for a split skin graft. Furthermore, it is also effective in reducing hypergranulation. These natural products have formed the basis of the development of a new treatment modality for burns (NexoBrid[®], MediWound Ltd) in high income settings, as an example of reverse technology. Its mode of action is based on the same enzymatic activity of papaya (and similarly pineapple and kiwi) with the aim to promote healing by debridement of the wound.

Conclusion: In low resource settings natural products derived from tropical fruits are easy to use, safe and effective in the treatment of burns, widely available and cheap. In these settings treatment with honey and papaya continues to be the basis of burn care with excellent results. These principles have now been successfully adopted in high income settings.

Step by step guide – how to apply dressings suitable for the severely burned patient

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Aim: To improve dressings for severely burned patients in Denmark that allow the patient to maintain physical functions while preventing infections, managing the level of exudate, preventing unnecessary pain and unnecessary dressing changes.

Methods: We (Department of Plastic Surgery and Burns Treatment, Copenhagen University Hospital, Denmark) have worked together with the Trauma Department to develop a visual “Step by Step guide,” to show how to apply appropriate dressings for every region of the body. We have also produced a “Tips and Tricks guide” to make the process easier and avoid common mistakes. These guides have been distributed to our own Department, Trauma Department, burns operating theatre and the Burns Clinic. These guides have also been (will also be) uploaded to the Department’s burns website (brandsår.dk), so that the Emergency Departments in the rest of the country can benefit from them.

Results: We have already experienced improvements in the initial dressings. Our colleagues find it easy to imitate pictures from the guide and they find it very helpful in the daily work. We have only received positive feedback.

Conclusions: The step by step guide has been used for a little while in our department. So, in our future work with burn victims, we will continue to improve the dressings and make more guides, if needed.

Clinical photography in burns using a secure, NHS approved app (ISLA)

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Aims: Photography is a well-established adjunct to assessment, documentation, and management of burns. Clinical photographs must comply with GDPR regulations outlined in the Data Processing Act 2018. We aimed to improve photographic documentation of burns to aid MDT-communication, track healing, and increase compliance with data requirements.

Methods: A retrospective staff survey was conducted to assess adherence to medical photography standards between January-March 2023. The survey investigated the frequency of clinical photography, the use of consent forms, and the storage and handling of images. Subsequently, an ISLA protocol was designed for the burns service and implemented alongside the app.

Results:

61% of respondents were doctors and 38% burns nurses. 69% were taken on personal devices, often with non-documented verbal consent. The majority used WhatsApp to share photos, which were rarely saved to patient records.

The introduction of ISLA enabled patients and clinicians to upload photos directly onto their e-records and for consent to be readily taken and recorded. Photos were taken directly on the ISLA website and therefore not stored on personal devices. The application is currently being utilised in all stages of burn care.

Conclusions: We present our experience using ISLA, a user-friendly, NHS-approved, GDPR-compliant solution for photographic documentation. Implementation has significantly improved the quality and security of photographic documentation, benefiting communication, patient care, and education. Future work is required to ensure that photographic quality is standardized in positioning, lighting and other parameters. Further research will focus on the effectiveness and sustainability of this approach across multiple clinical settings.

The management of burns and trauma cases using Kerecis fish skin graft in the 2020 Nagorno-Karabakh war

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Aim: To demonstrate the effectiveness of Kerecis Fish skin grafts in the management of combat injuries in the 2020 Nagorno-Karabakh war.

Methods: The author went to Armenia in September 2020 at the request of the Armenian government. He brought with him a quantity of acellular fish skin graft (FSG) from Kerecis™, and utilised this in many cases of burn and blast injury.

Results: Management with FSG induced wound granulation several days sooner in all cases, and even weeks in some instances, allowing a stepdown in the reconstruction ladder with earlier skin grafting procedures and a reduction in requirement of flap surgery. No infections were reported in any of the cases where FSG was used.

Conclusions: FSG presents favourable characteristics for use in austere environments: the product is rugged and robust, is low weight, easy to transport, and requires no complex tools or equipment for use other than standard field medical equipment. Further, the minimal training required for use makes FSG an ideal product for use when an overwhelmingly number of patients may need rapid treatment.

Application of FSG achieves early granulation tissue formation and a good coverage of the underlying wound resulting in low infection risk. However, as opposed to dressings or other temporizing measures, applying FSG begins the wound-healing process rather than simply buying time.

Staged Approach to Treating Chronic Burn Wound and Extensive Post-burn Knee Contracture with Clinical Suspicion of Marjolin's Ulcer: A Case Report

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Aim: We present a case of successful staged treatment for a chronic burn wound with extensive post-burn knee contracture using free transverse rectus abdominis myocutaneous (TRAM) flap and split-thickness skin graft (STSG).

Methods: A 72-year-old male with post-burn flexion contracture and a 10x3cm ulcer above his right knee joint, presented for treatment. He suffered burn injury as an infant, resulting in chronic post-burn scar contracture (PBSC), growth disturbance, and flexion contracture. Preoperatively, he had limited range of motion (ROM) of 120-degrees and weight-bearing imbalance due to limb length discrepancy. Scar contracture release was performed initially, followed by negative pressure wound therapy for a week, allowing rapid ambulation and ROM recovery. After pathological confirmation without malignancy, a 20x10cm muscle sparing free TRAM flap was used to cover the 40x10cm resultant defect above the knee joint, and STSGs were used on remaining skin defects. The TRAM flap with 12 perforators was preferred over the deep inferior epigastric perforator due to extensive preoperative skin defect. Intraoperative indocyanine green angiography showed good perfusion throughout Hartrampf's zones I-IV, except for the distal margin of zone IV.

Results: Reconstructed flap and graft survived, achieved marked ROM improvement with 170-degrees of active knee extension, and improved weight-bearing imbalance.

Conclusions: We performed staged surgical treatment for chronic burn wound with extensive PBSC for obtaining sufficient ROM and pathological confirmation. Extensive resection, rapid ROM exercise and staged reconstruction using free myocutaneous flaps and STSG may enable successful surgical treatment of PBSC.

Treatment of mine-explosive injuries of the shoulder and scapular area using Latissimus Dorsi Muscle Flap

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Aim. Analysis of the efficacy of using the latissimus dorsi muscle flap (LDMF) in mine-explosive lesions of the shoulder and scapular region.

Methods. During 2022, we observed 11 military personnel with mine-explosive wounds of the shoulder and scapular region. The age of patients is from 28 to 56 years. The injuries were combined with penetrating wounds of the chest, craniocerebral trauma. The defect area is up to 20 cm × 12 cm. 7 patients had open multicomminuted fractures of the humerus with tissue defects, two patients had a 7 cm defect in the humerus. Three patients had fractures of the scapula with tissue defects. One had a traumatic shoulder tear. All the wounded had external fixation devices. All of them underwent VAK-therapy.

Results.Reconstructive surgeries were performed within 1 to 1.5 months after the injury. To close soft tissue defects, LDMF was used in 7 patients, LDMF and bone grafting with a fragment of the fibula were used in 2 patients with a humerus defect, and a muscle flap was used in 2 patients, followed by grafting.

Conclusions The use of a LDM flap in patients with MEI is an effective method of skin restoration in cases of damage to the shoulder and scapular area. It also makes it possible to improve the blood supply of the free bone graft in areas with low vascularity.**Key words:** Mine-explosive injuries of the humerus, clavicle and scapula, flap of the latissimus dorsi muscle.

A novel application technique of MatriDerm to improve handling and ease of use, demonstrated with a case series.

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Aim: MatriDerm®, a bovine collagen-elastin dermal template, is currently the only dermal template available that contains elastin. Frequently used in a one-stage procedure with a split-thickness skin graft, this dermal template can improve cell proliferation, accelerate revascularisation, and improve the quality of regenerated tissue. However, its fragile nature makes it a difficult product to handle especially when in contact with moisture or wound exudate. In this study, a new intra-operative handling technique is described to improve efficacy and accuracy of the use of fragile dermal templates such as MatriDerm.

Methods: A new application technique was developed by the Burns Unit of Concord Repatriation General Hospital to delivery MatriDerm onto a well-vascularised wound bed in a single stage composite step. Five patients, admitted between October 2022 to December 2022, are included in the case series, who received MatriDerm applied with this new technique.

Results: Using the new composite application technique demonstrated and described in detail, all patients achieved complete wound closure. The application technique allowed for more efficient operating time, with less correction of skin graft manipulation needed over the MatriDerm. Graft take, wound closure outcomes and long-term outcomes were not negatively impacted by the technique.

Conclusions: MatriDerm can cause delays in operating time due to its 'tissue paper' like handling properties. By applying this composite technique, the ease of use and efficiency was greatly improved. This technique is not only effective for MatriDerm but can be applicable for any fragile dermal template, thereby improving anaesthetic time and overall operative efficiency.

Facial burns - experience and recommendations of Dr Stanislaw Sakiel Centre for Burn Treatment

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Aim: Facial burns represent a major clinical challenge. There are a number of therapeutic options for treating a facial burn. The aim of the study was to present selected procedures used in CLO in the treatment of facial burns.

Method: In 2009, the Dr Stanislaw Sakiel Center for Burn Treatment in Siemianowice Śląskie in Poland began using amniotic membrane grafts for superficial burns, mainly facial burns. Other treatments have also been used, including hydrosurgery and selected skin substitutes.

Results: Studies of the clinical effects of the use of the human amnion showed a different location of the application of this graft. In an adult wound care hospital, the amnion was used to treat wounds extending to the epidermis and dermis, classified as IIA and IIB burns.

Conclusions: Particularly in the case of facial burns, the wounds are fully healed after application of the amnion. The great manipulative ability of the amniotic graft also greatly contributes to its clinical use in facial burns.

Burn blisters as natural occlusive dressings? – an in vitro study

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Aim

The present work measured the influence of burn wound fluid on cell proliferation, inflammation, and angiogenesis to analyze whether burn blisters work as natural occlusive dressings.

Methods

Wound fluid was collected thru sterile puncture of burn bladders of 29 patients with partial-thickness burns. Blood serum samples were collected from each patient as a control. Eight assimilable patients were selected and their samples were analyzed. A semiquantitative antibody array for multi-cytokine detection focusing on proinflammatory and proangiogenic factors was performed and the concentration of IL-8 and IL-6 was measured with an ELISA. The influence of the wound secret on fibroblasts was assessed with the measurement of cell proliferation (Alarmablue-Assay), cytotoxicity (LDH-Assay), and cell migration (Scratch Assay). The angiogenetic response of endothelial cells (HUVEC) was analyzed with the Tube Formation Assay.

Results

The wound fluid of burn wounds showed a significantly higher cytotoxic potential and lower cell viability of fibroblasts compared to the serum control. There was no difference in cell migration or angiogenesis. Burn blister fluid contained higher levels of the pro-inflammatory mediators IL-6 and IL-8, but this did not reach statistical significance.

Conclusion

Burn wound fluid influences the proliferation and viability of fibroblasts. Like occlusive dressings, intact burn blisters concentrate multiple mediators on the wound site. There is no significant increase in inflammatory mediators, so this study could not find any need to directly deroof burn blisters.

Enzymatic debridement with NexoBrid® and its influence in management decisions for deep partial thickness burns

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Aims: Enzymatic debridement of thermal burn wounds with a proteolytic enzymes solution enriched in bromelain, known as NexoBrid®, was approved in the European Union in 2012. In Greece it is available since 2021. We present our experience of first 1,5 years of NexoBrid® application.

Methods: We used NexoBrid® in 14 patients (TBSA: 20-50%) and 18 applications in deep partial thickness burn wounds. The product is reconstituted and applied with the appropriate analgesic treatment on the burn wounds (5g / 2.5% TBSA) and removed after 4 hours. We collected and analyzed demographic data of patients, the percentage of total body burn surface area treated, the type of burn, time of application, type of analgesia, the healing time and the need for skin grafting.

Results: No adverse reactions were observed. The treated burn surface area (face, limbs, lower extremities) ranged from 2-20%. The application of NexoBrid® is easy for the physician and effective for the patients but requires proper pain management and adaptation of the working time flow in the Burns ICU. We noticed a reduction of burn wounds that required skin transplantation.

Conclusions: NexoBrid® is a new tool to achieve early non-surgical escharectomy. The next challenge is the appropriate post-application wound management and timing of eventual surgical intervention.

Clinical effectiveness of split thickness skin graft using porcine-derived artificial dermal substitute (Insuregraf®)

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Aim

To evaluate the clinical effectiveness of one-stage split thickness skin graft (STSG) procedure using porcine-derived artificial dermal substitute, Insuregraf® (Hyundai Bioland Co., Korea), in preventing complications such as joint contractures and hypertrophic scarring following wound healing

Methods

Skin graft was performed on the patient who had suffered third-degree burns measuring 250cm² on the volar aspects of the forearm and elbow due to contact burns in September 2022, on the 10th day post-burn.

After removing the eschar, electrocauterization was performed to reduce bleeding. Insuregraf® was then applied to the hemostatic wound area, followed by hydration with saline, and a STSG was performed simultaneously on top of the Insuregraf®.

The skin graft was monitored for viability every 3-4 days and a follow-up observation was conducted on the scar for 7 months.

Results

After two weeks, the graft had completely taken and for the most part the scars were flat and well-maintained without significant hypertrophic scarring during a follow-up period of 7 months. There were no symptoms of joint contracture, pain, or itching.

Conclusions

Using porcine-derived artificial dermal substitute, Insuregraf® for one-stage STSG can minimize hypertrophic scarring and joint contracture.

Acute kidney injury in a severe burn patient after topical treatment for wound contamination

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Aim: To review a rare complication in burn patients based on a clinical case, acute kidney injury due to topical treatment with colistin/gentamicin.

Methods: 37-year-old male patient with flame burns over 35% of his body surface area. Enzymatic debridement based on bromelain (Nexobrid®) was applied on the day of admission. The patient required ventilator support, vasopressor support with norepinephrine, hemodialysis and hemofiltration. The patient was extubated on 9th day postburn (DPB). On the 15th DPB, surgical debridement and grafting were performed.

Results: On the 30th DPB, green exudate compatible with *Pseudomonas* was detected in the dressing of the lower limbs, so topical treatment with colistin and gentamicin was applied. On the 34th DPB, an increase in creatinine was observed. Among the medications prescribed, only metamizole was a possible cause of renal dysfunction. Nephrotoxic drugs were discontinued. Creatinine values deteriorated rapidly and peaked around 9 mg/dl, with preserved diuresis and good volume management. Immune-mediated causes were ruled out, and laboratory tests confirmed supratherapeutic levels of gentamicin, which was identified as the main cause of acute tubulointerstitial necrosis.

Conclusions: Antibiotic ointment is commonly used to suppress bacterial growth on newly grafted tissue, as it is considered non-toxic and maintains the moist wound environment needed for epithelial growth(1). There are very few cases reported in the literature regarding acute tubular necrosis in burn patients caused by topical antibiotic treatment, and currently there are no available treatments(2). Therefore, prevention is the most crucial aspect(3).

Enzymatic debridement - when? where? how? why?

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Aim

This study aims to highlight the indications and results of applying a mixture of proteolytic enzymes with high bromelain content for the treatment of deep burns in a single center. Is personal experience view.

Methods

The study included two groups (one group of 15 patients and another of 30 patients) with burns surfaces between 10 and 45% TBSA and depths of IIB and III. The first group was subject to early excision and skin grafting; for the second group, enzymatic debridement was used. We recorded the effectiveness of enzymatic debridement, the healing time, the need for grafting after debridement, the scars and patient satisfaction. Both the classic graft harvesting technique with the electrodermatome and the Meek micrografting technique were used.

Results

The enzymatic debridement efficiency was between 85 and 92%. In 8 cases out of 30, skin grafts were necessary. Spontaneous epithelization was noticed in the other 22 cases. The patients recorded less pain, less bleeding and less damage to surrounding healthy tissues than the group that underwent surgical debridement. The aspect of the scar tissue was better, with relatively aesthetic results. Present clinical experience with shows several advantages of enzymatic debridement compared with tangential necrectomy.

Conclusions

The introduction of enzymatic debridement as an alternative to surgical debridement for IIB and III-degree burns has changed standard burn care. This method has the additional benefit of selectivity - removal of non-viable tissue and preservation of viable tissue, reducing the number of surgical interventions, infection rates and days of hospitalization.

Meek micrografting – a new old technique and its role and place in the treatment of extensive and deep burns

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Aim

The use of the Meek technique has gained a large scale in the last decades. The aim of the study is to confirm the role and importance of Meek technique in the therapeutic management of extensive and deep burns.

Methods

We studied a group of 42 patients with deep burns (IIB-IIIrd degree) and surfaces between 15 and 60%TBSA, produced by flame, hot liquid and contact, with localization on all anatomical regions of the body. In all cases, the indication for early excision and grafting was established. The excision was done in a supra-fascial plane or by enzymatic debridement. The grafting was performed using the Meek micrografting technique.

Results

In the studied group two of the women were pregnant in weeks 22 and 36, with burns of 15% and 18% TBSA respectively. The deep burns were early excised and the micrografting was performed by expanding in a ratio of 1:3 in 10 cases, 1:4 in 14 cases, 1:6 in 12 cases and 1:9 in 5 cases, depending on the surface to be grafted and on the existence and quality of the graft donor areas. The micrograft integration rate varied from 82% to 100%.

Conclusions

The Meek micrografting technique is a life-saving solution in the case of deep and extensive burns, but it can also be used in "special" cases (pregnant women, the elderly, children), being able to cover large postexcisional surfaces using narrow donor areas.

Our experience with fish skin grafts in full-thickness burns – a clinical case series

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Introduction. Fish skin grafts (FSG) have proven to be effective not only in chronic wound healing, but also in burns.

Aim. We aimed to perform wound bed modulations using FSG in two patients with heavily colonized full-thickness burns.

Methods. Two patients with heavily colonized full-thickness burns of about 20% TBSA were treated with Bactigras® and FSG, which we meshed on site. After one week, we performed re-application of the FSG. In the first patient, a young girl who was a war victim in Ukraine, we successfully reduced the bacterial load and increased the amount of granulation tissue on the exposed tendons, so that autologous grafting was finally possible. The second patient underwent deep excision and autologous grafting, which resulted in graft failure. Because the patient was not suitable for another surgery due to various comorbidities, we initiated a wound bed modulation with FSG, again meshed on site. Only 2 weeks after the first application, the wounds showed good granulation, with only small non-healing spots left, which we decided to micrograft under local anesthesia.

Results. Five weeks after transfer to our center, patient 1 showed good healing progression of all burned areas and was able to be transferred in a rehabilitation facility. Patient 2 also showed an excellent healing progression of all burnt areas 2 weeks after grafting.

Conclusions. To our experience, FSG can be used to enhance granulation and vascularization before grafting or even as an alternative to grafting. Secondly, an adequate graft take rate can be ensured.

Necrotizing fasciitis within a Burn Center: lower limb salvage

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Aim – Necrotizing fasciitis (NF) is a rare but rapidly progressive, potentially lethal bacterial infection of the subcutaneous tissue. Many similarities exist between NF, extensive dermatologic pathologies and burn injuries in terms of the need for meticulous wound care and multidisciplinary management. For this reason, these entities are treated in our Burns Center.

Methods – We report a case of lower limb NF in a patient with no associated comorbidities. A 42-year-old male patient presented with acute painful swelling of the right knee. After ruling out a fracture, he was discharged with analgesic treatment. Less than 24h later, he was transferred to the emergency room with hemodynamic instability and hypoxemia.

Results – Five serial debridements were performed. *Streptococcus pyogenes* was isolated. The patient survived the acute infection and received subsequent reconstruction. For lower extremity salvage, we used a Latissimus dorsi flap, an anterolateral thigh flap, a medial gastrocnemius flap and skin autografts. For coverage of the superficial femoral vessels, an adductor magnus split was performed. A cutaneous defect on the dorsum of the left hand caused by an extravasation was covered with a SCIP flap. The patient was discharged after three months of hospitalization. The patient is able to walk and is undergoing rehabilitation to regain joint range of motion.

Conclusion – NF is similar to burn wound infection in that treatment requires aggressive surgical debridement, complex wound management and extensive reconstruction. For this reason, Burns Center are ideal sites for the treatment of extensive necrotizing fasciitis.

"Efficacy of Epicite® Hydro-Active Dressing in the Treatment of Burn Wounds: A Multi-center Study"

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Introduction: Burn wounds can cause significant morbidity and mortality, requiring specialized care to promote healing and prevent complications. Epicite® is a nanocellulose-based dressing that has shown promise in wound healing. This study aimed to evaluate the efficacy of Epicite® in the treatment of burn wounds.

Methods: The medical records of 68 patients with burn wounds treated with Epicite® were reviewed. Of these, 63 patients met the inclusion criteria and were included in the analysis. Data on patient demographics, burn extent and depth, and treatment with Epicite® were collected. The primary outcome measure was re-epithelialization and healing of the wound.

Results: The study population had an average age of 38 years, with 67% males and 33% females. The maximum extent of the burned body surface area was 37%, and the minimum was 10%. Most patients had deep second-degree burns (60%). Treatment with Epicite® resulted in no infections or complications. The average time to complete re-epithelialization was consistent with expected clinical results.

Conclusions: This study demonstrates that the use of Epicite® nanocellulose cover in the treatment of burn wounds is safe and effective, with a high percentage of re-epithelialization and no reported complications. Epicite® could be a useful therapeutic option in the management of burn wounds. Further studies with larger sample sizes and longer follow-up periods are needed to confirm these findings.

Keywords: Epicite®, nanocellulose, burn wounds, wound healing.

Hand burn treatment in the conditions of moist medium

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Aim: Hand burns take significant place in the structure of thermic injuries of different body parts.

Material and Methods: We analyzed the results of treatment of 31 patients with limited superficial burns of hand. After primary surgical processing of hand injuries with burns of II-III A degree and application of antiseptic solution to all patients there were used sterile disposable polyethylene packs of a large size with 0,9% of sodium chloride solution fastened by bandages. The evidence of pain syndrome was estimated daily in scores according to visual-analogue scale (VAS).

Results: In the process of observation, it was established that the pain decreased significantly or was completely eliminated immediately after surrounding of burn injury with polyethylene pack with sodium chloride solutions. In fact, daily bandaging became painless. Assessment of pain syndrome according to VAS made 3.8 scores during the first 24 hours then decrease of indices up to 3.75 scores was observed during the next 24 hours and to 3.06 scores during the 3d 24 hours. In patients with the II degree of burns the healing of wounds was noted 5 days later on the average. In patient with the III degree of burns it required 9 days of treatment. Not a single patient had any clinical signs of infectious complications of wound process.

Discussion: The wound to created optimal microsphere for wound healing, to prevent microorganisms invasion, to have sufficient permeability for gases, to exclude dryness of the wound floor, to have elasticity..

Deep burns of lower extremities: Epidemiology, management and consequences

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Aim: Severe burns of lower extremities are complex and challenging injuries. The Standard of care necrotomy, necrosectomy with skin grafting – is often associated with poor functional or aesthetic outcome.

Methods: This is a retrospective study of the epidemiology and management of deep burns of lower extremities presenting to the Burn department of RSCUMA and Samarkand Inter-Regional Burn Center, Samarkand, Uzbekistan. A total of 167 were treated of which 129 were included in this study. Approximately 65% were in the pediatric age group and the gender distribution varied dramatically for adults and children. Most patients had deep foot burns caused by sandal heaters. The following methods of treatment were developed: initial surgical debridement of the wound, necrotomy with application of chemotherapeutic medications and early necrosectomy, the removal of necrotic tissues and preparation the wound for early autodermoplasty.

Results: Of all surviving patients, 39, 3% came back after treatment and burned skin restoration to the hospital for a new surgery because they had lost the ability to exercise normal movement of their affected extremities. Complications, especially in the fingers and joints, were as follows: contractures, ulcerating scars, complete and partial dislocations. Of all patients, 89% showed satisfactory results, and 11% were unsatisfactory. Unsatisfactory results were reported for the children who had more than 5 years after the burn incident and irreversible changes in the tissues.

Conclusions: This effective treatment method contributed to the restoration of lower extremities function in patients lessened their joint deformities, post-burn contractures, and also shortened hospital stay.

The use of panthenol and hyaluronic acid creams following enzymatic debridement with Nexobrid in deep partial thickness and full thickness burns.

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Aim

Evaluate the use of hyaluronic acid and panthenol creams in burn wound management following enzymatic debridement with bromelain.

Methods

We conducted a prospective study in the use of less commonly utilized creams containing hyaluronic acid and panthenol, following enzymatic debridement with bromelain (Nexobrid).

The case series included 7 adult patients who were admitted for partial thickness and full thickness thermal burns and scalds, between 10 to 20% TBSA.

Results

Pseudoeschar formation and spontaneous epithelization was monitored on all 7 patients. Only 4 developed pseudoeschars on full thickness burns and none of the patients developed them on the deep partial thickness lesions. The full thickness burns required skin grafting, and secondary healing was observed on the deep partial thickness burns.

Conclusions

Nexobrid has been shown to promote faster and more complete epithelization compared to surgical debridement of deep partial thickness burns. The removal of the necrotic tissue reduces the bacterial load in the wound which further promotes healing. However, pseudoeschars are known to appear in both partial-thickness and full-thickness burns after the enzymatic debridement, which delays healing.

The lack of a consensus regarding the optimal wound dressings following enzymatic debridement with Nexobrid, has prompted us to try previously unexplored options, like creams with panthenol and hyaluronic acid.

However, it's important to note that this study had a very small sample size, and additional research is needed to determine whether pseudoeschar prevention and rapid re-epithelization is achievable by using those hydrating creams.

Keywords

bromelain, panthenol, hyaluronic acid.

Our clinical experience in enzymatic debridement of deep partial thickness and full thickness facial burns - Case presentation -

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AIM

Our experience over the years in the use of Nexobrid, the effectiveness of the product proven by fast, selective and effective debridement of deep dermal burns, the significant reduction of the need for SOC, encouraged us to expand the use of this techniques on facial burns.

Deep facial burns frequently require SOC, but following results in unaesthetic scars and post-burn sequelae with functional deficits. The preservation of viable facial layers, especially the viable dermis, are essential for spontaneous epithelization and the absence of unsightly scars. Deep facial burns are often a challenge. Early debridement promises a better aesthetic and functional result.

METHODS:

25-year-old patient - thermal flame burn injuries IIB-IIIdgr, 25% TBSA.

We used internal protocol for EDNX.

It should be mentioned the off-label use at the face for the first time in our unit.

RESULTS:

The quality of scars was evaluated according to the Vancouver scale.

1 month score 6, 3 months score 4, 6 months score 2

CONCLUSION:

EDNX was a very good option in the treatment of deep dermal facial burn demonstrated by spontaneous epithelization early reduction of edema, preservation of viable tissues and effective alternative to SOC. Proved to be safe also in high-risk patient. Good promising aesthetic result and earlier rehabilitation are additional reasons to continue using Nexobrid as the first-choice treatment of deep dermal facial burns. The effectiveness of the treatment will be proven by the appearance of the scars according to the Vancouver scale and the long-term follow-up of the patient.

Our clinical experience in enzymatic debridement of deep partial thickness and full thickness burns in combination with HY Tissue Micrografts

Case Presentation

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AIM:

Covering major burns is a still major challenge, even though several strategies are available so far to deal with this situation.

Our novel concept consist in using EDNX and HTM autologous micrografts avoiding SOC and cover large BSA.

METHODS:

Our experience was based on few cases and limited use of EDNX and HTM up to 5% TBSA, but good promising aesthetic and functional results, no need for SOC on treated lesions and earlier rehabilitation encouraged us to expand the use of this novel technique up to 25% TBSA.

Our new technique is a regenerative technique of the future in order to reduce the need for grafting when skin donor areas are limited and avoiding use of allografts or xenografts currently unavailable nationally.

Nexobrid has been shown to have unique selectivity for non-viable tissues while HTM is innovative technology based of autologous micrografts.

39-year-old patient - thermal flame burn injuries IIB-IIIdgr., 45% TBSA.

RESULTS:

All areas treated didn't require additional surgery and coverage.

In less than 2 weeks the lesions completely epithelized.

The quality of scars was evaluated according to the Vancouver scale.

1 month score 6, 3 months score 4, 6 months score 2

The quality of the scars is clearly superior to SOC scar quality.

CONCLUSION:

The need for new techniques or improvement and standardisation of current ones is essential.

The combination of EDNX and HTM is an excellent treatment option for major burned patients.

This technique will show its efficacy when higher standardization and experience is achieved.

Enzymatic demarcation - 8 years of experience of Dr Stanislaw Sakiel Centre for Burn Treatment

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Aim: Enzymatic demarcation becomes one of the surgeon's primary tools in the treatment of burns. In the method using Nexobrid containing proteolytic enzymes, it is assumed that only the necrotic tissue would be removed. The living tissue would remain intact and prepared directly for the next stage of treatment, i.e. covering the wound with a graft or other special dressing. It seems to be the best method of demarcation in burns. After these few years Centre for Burn Treatment in Siemianowice Śląskie in Poland worked out based on its own experience, developed procedures that allowed for optimization and speed in the treatment of burns.

Methods: From May 2016 till now in Dr Stanislaw Sakiel Centre for Burn Treatment in Siemianowice Śląskie in Poland enzymatic demarcation was performed on 128 patients. The surface range oscillated between 1 – 78 % of the total body surface area, the burns were in degree II and III, mostly mosaic.

Results: In all analyzed cases, the use of enzymatic demarcation /Nexobrid/ was a rational procedure for early demarcation of necrosis and avoiding the need for decompressive incisions. However, requiring secondary necrosis occurred in more than half of the cases. Despite following the guidelines.

Conclusions: The procedure of enzymatic necrotic tissue debridement becomes a golden standard in the therapy of burned patients. However it should be understood as the first step in the long-lasting therapy of burned patients as a number of analysed patients required traditional surgical demarcation and prolonged hospitalization.

Towards increased quality of burns nursing by tailored education

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Aim:

In order to limit staff shortage, and to enable carrier development, staff retention and satisfaction, our aim is to increase the number of nurses that completed the national burns specialization (the first in the international burn field), as well as the ICU specialization, both officially recognized by the College of Dutch Healthcare Studies, by tailored education and associated reward.

Methods:

The national education system for acute care specializations for nurses, like burn care and intensive care, requires, firstly, a basic acute care course, consisting of four building blocks (enstrustable professional activities (EPA's)). EPA's describe which knowledge, skills, attitude and level of supervision is required for the specialization. Secondly, nurses follow eight burns specific or eight intensive care specific EPA's for a recognized diploma per specialization. To facilitate a shorter education process for graduated ICU nurses that aim to get more specialized in burn care, a tailored course of four EPA's is proposed by and for ICU nurses, leading to a certification. This certification involves an increased salary.

Results:

Currently, the first adapted course, consisting of four EPA's, starting this year, is already fully booked, implying that this initiative is widely supported amongst ICU nurses.

Conclusions:

This shortened education program corresponds to the needs of nurses and enables a tailored course with an accompanying salary increase, leading to carrier development, staff retention and satisfaction.

The occurrence of itch after burns: is there a need for oral medication?

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Aim

This study describes the occurrence and management of itch in adult patients admitted to the Burn Center in Rotterdam, with a follow up for one year.

Methods

For one month all adult patients admitted were asked to participate. After the first episode of itching the Burn Itch Questionnaire (BIQ) was used to record itch frequency until discharge. From the patient's medical dossier data were extracted on medical history, prescribed medication and routine usual care. Follow up was for 3, 6 and 12 months after discharge.

Results

In total 35 patients were admitted (80% male). Most injuries (70%) were induced by flame burns. Fifteen respondents (43%) required an operation. TBSA varied from 0.5% up to 31%. The first occurrence of pruritus was seen 3 days after burn injury (range 3-25 days). The score (BIQ) varied from 3 or less in 24 respondents (69%) to more than 8 in one respondent (3%). After three and six months, 40% and 46% of the respondents were without pruritus, respectively; after 12 months this was 60%. Alhydran® based on pure Aloe Vera was used as topical agent. After 12 months 29% still applied this ointment which was preferred to oral medication. After 12 months, only one patient used anti-histamines.

Conclusion

Pruritus is common after burn injury. Forty % of the respondents still experience itch after one year; oral medication is often not needed; Topical ointments such as Alhydran® are preferred.